COMMENTS SUBMITTED TO ENVIRONMENTAL PROTECTION AGENCY

Air Alliance Houston, Alaska Community Action on Toxics, American Bottom Conservancy, California Communities Against Toxics, California Safe Schools, The City Project, Community In-Power and Development Association, Deep South Center for Environmental Justice, Del Amo Action Committee, Downwinders At Risk, Earthjustice, Ironbound Community Corporation, Louisiana Bucket Brigade, Louisiana Environmental Action Network, Los Jardines Institute, Lower Mississippi Riverkeeper, Missouri Coalition for the Environment, Natural Resources Defense Council, Neighbors for Clean Air, New Mexico Environmental Law Center, North Carolina Environmental Justice Network, Oak Grove Neighborhood Association, Poverty & Race Research Action Council, Public Interest Law Center of Philadelphia, Royal Oak Concerned Citizens Association, Rural Empowerment Association for Community Help, Sierra Club, Southern Environmental Law Center, West End Revitalization Association

To: Office of the Science Advisor, U.S. Environmental Protection Agency
Cc: Bob Perciasepe, Acting Administrator, U.S. EPA
Re: Notice, Request for Information and Citations on Methods for Cumulative Risk Assessment, EPA-HQ-ORD-2013-0292; FRL-9807-5, 78 Fed. Reg. 25,440 (May 1, 2013)
Date: June 28, 2013 (Submitted via e-mail and regulations.gov)

SUMMARY

The dire reality is that environmental hazards affect some communities much more than others. Pollution and polluting sources are often concentrated together, overburdening and overwhelming communities and populations, and causing greater health effects.[1] Current risk assessment practices, which have failed to keep up with current science and do not account for real-world impacts, jeopardize the health of communities surrounded by sources of pollution – such as coal plants, refineries, cement kilns, chemical plants, metal smelters, incinerators, dry cleaners, highways, truck routes, Superfund and other hazardous waste sites.

In order to fulfill the agency's renewed commitment to environmental justice, as outlined in Plan EJ 2014 and the recommendations from the National Academy of Sciences, National Research Council, EPA must update its approach to account for the cumulative impacts and risks faced from early-in-life exposure (including childhood) and from exposure to multiple sources, as well as the increased vulnerability from socioeconomic stressors, and multiple pollutant and

[1] Cal. EPA, Office of Envtl. Health Hazard Assessment ("OEHHA"), "Cumulative Impacts: Building a Scientific Foundation" (Dec. 31, 2010), http://oehha.ca.gov/ej/pdf/CIReport123110.pdf (citing numerous research studies showing that exposure to pollution-emitting facilities, hazardous waste facilities and disposal, toxic releases, non-attainment air areas, high motor vehicle air pollution areas, and other types of pollution is more likely to be concentrated in communities with higher minority and lower income populations).

pathway exposures.[2] To this end, we urge the Risk Assessment Forum Technical Panel to do the following:

Incorporate the real-world experience and perspective of people who live in communities that are overburdened by pollution and other environmental hazards.

Too many communities of color and lower income communities are exposed to a disproportionate share of air pollution and all of the resulting health risks and impacts. We have attached statements that summarize the situation and provide stories from various example communities around the United States that describe the on-the-ground impact of EPA's scientific policy decisions and the urgency of reforms in risk assessment practices. (Appendix E)

Advance environmental justice and protect public health by establishing guidance which provides a means to reduce cumulative impacts in overburdened communities.

There is clear and mounting evidence that the concentration of environmental hazards in lower income communities and communities of color threatens public health and that current risk assessment practices contribute to environmental inequities and increase disparities. Experts have identified addressing cumulative impacts as a critical step to ensuring environmental justice and reducing disparities. At minimum, this must include:

(1) Immediately updating existing guidelines for conducting risk-based assessments to incorporate mechanisms for accounting for the cumulative impacts of multiple exposures and underlying vulnerabilities;

and

(2) Moving beyond current risk frameworks and incorporating alternate methods to assess health threats from environmental exposures in a way that will better capture the impacts faced by overburdened communities and support policies to reduce them.

We appreciate your time and careful consideration of all of these issues, and we urge you to show strong leadership and issue up-to-date guidance without delay so that EPA actions will finally reflect the best available science. Commenters also urge EPA to consider and incorporate the feedback of affected communities and of experts in the field, including the work of those cited in these comments, into EPA's effort.

For more information on the issues discussed in these comments, please contact: Miriam Rotkin-Ellman, Senior Scientist, Natural Resources Defense Council (mrotkinellman@nrdc.org), Emma Cheuse, Senior Associate Attorney, Earthjustice (echeuse@earthjustice.org), and Marianne Engelman Lado, Staff Attorney, Environmental Health Group, Earthjustice (mengelmanlado@earthjustice.org).

[2] EPA, Plan EJ 2014, http://www.epa.gov/compliance/ej/plan-ej/.

I. TO ADVANCE ENVIRONMENTAL JUSTICE, EPA MUST REDUCE CUMULATIVE IMPACTS IN OVERBURDENED COMMUNITIES.

The concentration of environmental hazards in lower income communities and communities of color threatens public health and results in disparities.

The scientific data show that environmental hazards affect some communities much more than others. Pollution and polluting sources are often concentrated together, overburdening and overwhelming communities and populations, and causing greater health effects.[3]

These same communities – with many polluting sources and toxic sites – are often cities, towns, or neighborhoods that have higher numbers of people of color and people with lower income than the national average (or city or state averages).[4] A growing body of scientific research shows that communities with significant populations of people of color and lower income people are more exposed to environmental hazards and face greater harm from exposure. This is because pollution exposures can combine, increasing the harm, and also can have a synergistic effect with other health stressors in people's daily lives.[5] As scientists have explained, these communities often have higher levels of biological susceptibility (such as due to higher rates of pre-existing health conditions like obesity, cardiovascular disease, diabetes, and certain kinds of cancer). They also have increased social vulnerability to environmental hazards because of their greater likelihood and duration of exposure to pollutants and other kinds of stress.[6]

These communities and populations often have less access to quality, affordable health care which only exacerbates the impacts of environmental hazards. Health problems in many communities are closely associated with both social and environmental factors – including adverse perinatal outcomes like prematurity and low birth-weight, cardiovascular disease, and self-rated health.[7] Socioeconomic disparities thus exacerbate the effects of environmental hazards.

Current risk assessment practices contribute to environmental inequities and increase disparities.

Although EPA has made strides in reducing pollution and the health threats caused by environmental contaminants, these benefits have not been equally distributed. Multiple research studies and EPA investigations have found increased pollution and contaminant burden in lower

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[3] Cal. EPA, OEHHA, "Cumulative Impacts," *supra* (citing numerous research studies showing that exposure to pollution-emitting facilities, hazardous waste facilities and disposal, toxic releases, non-attainment air areas, high motor vehicle air pollution areas, and other types of pollution is more likely to be concentrated in communities with higher minority and lower income populations).
[4] Rachel Morello-Frosch, Zuk, Jerrett, Shamasunder & Kyle, *Understanding The Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30(5) Health Affairs 879, 881 nn.24-26 (2011) (citing sources).
[5] *See, e.g.*, *id*. at 879 (citing Clougherty J. & Kubzansky L., *A Framework for Examining Social Stress and Susceptibility in Air Pollution and Respiratory Health*, 117(9) Environ. Health Perspect. 1351 (2009)).
[6] *Id*. at 881-82.
[7] *Id*. at 880.

income communities and communities of color that contribute to poor health outcomes. Risk assessments conducted by EPA as part of establishing regulations and implementing policies help determine the contaminant burden in these communities. EPA's failure to incorporate the current science on the impacts of cumulative exposures and population vulnerabilities into these risk assessments contributes to potentially unhealthy exposures.[8]

For example, EPA's own environmental justice analysis has found that sources of toxic air pollution listed under Clean Air Act ("CAA") section 112, such as lead smelters, chromium electroplaters, and many others, frequently create disproportionate health risks for minority and lower income communities.[9] This problem is exacerbated by the fact that multiple sources of pollution are likely to be more concentrated in minority and lower income communities, creating a serious environmental justice problem.[10] Currently, risk assessments performed under section 112 fail to adequately incorporate aggregate exposures from multiple sources, cumulative risk from multiple pollutants, exposure from multiple pathways, and underlying vulnerability due to individual or community factors.[11]

Additionally, when researchers evaluated the National Ambient Air Quality Standard (NAAQS) for lead they found that the standard was not sufficient to protect vulnerable populations from significant cognitive detriment – measured as the loss of more than 2 IQ points (*i.e.*, the metric EPA itself chose to use in the Lead NAAQS). These researchers found a consistent pattern among lead toxicity studies indicating that the degree to which lead exposure resulted in cognitive detriment (measured by the concentration-response function) was greater among populations with a lower socio-economic status (SES) than the general population. Specifically, the median estimate of the concentration response function among general population studies was -1.75 points/µg/dL blood lead as compared to that for the low SES studies of -2.40 points/µg/dL blood lead.[12] This increased susceptibility was not incorporated into the risk assessment that was used to derive the NAAQS and therefore did not provide adequate protections for this population.

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[8] *Id.*

[9] *See, e.g.*, EC/R Memo, Prepared for EPA, "Risk and Technology Review - Final Analysis of Socio-Economic Factors for Populations Living Near Secondary Lead Smelting Facilities" at 9-10 (Dec. 2011), EPA-HQ-OAR-2011-0344-016; EC/R Memo, Prepared for EPA, "Risk and Technology Review - Analysis of Socio-Economic Factors for Populations Living Near Hard Chromium Electroplating Facilities" at 7-8, EPA-HQ-OAR-2010-0600-0601.

[10] *See, e.g.*, Cal. EPA, OEHHA, "Cumulative Impacts," *supra* (citing numerous research studies showing that exposure to pollution-emitting facilities, hazardous waste facilities and disposal, toxic releases, non-attainment air areas, high motor vehicle air pollution areas, and other types of pollution is more likely to be concentrated in communities with higher minority and lower income populations).

[11] *See, e.g.*, EPA, OAQPS, "Residual Risk Assessment for the Secondary Lead Smelting Source Category" (Dec. 2011), EPA-HQ-OAR-2011-0344-0160; "Draft Residual Risk Assessment for the Mineral Wool Production and Wool Fiberglass Manufacturing Source Categories" at 23 tbl. 3.1-1; *id*. at 30 tbl. 4.1-1 (Sept. 2011), EPA-HQ-OAR-2010-1042-0086; "Residual Risk Assessment for the Chromic Acid Anodizing, Decorative Chromium Electroplating, and Hard Chromium Electroplating Source Categories" (Aug. 2012), EPA-HQ-OAR-2010-0600-0630; "Draft Residual Risk Assessment for 7 Chemical Source Categories" (Nov. 2011), EPA-HQ-OAR-2011-0435-0018; "Draft Residual Risk Assessment for the Ferroalloys Source Category" at 27-31 (Oct. 2011) EPA-HQ-OAR-2010-0895-0046; "Residual Risk Assessment for the Oil and Gas Production and Natural Gas Transmission and Storage Source Categories," (Apr. 2012) EPA-HQ-OAR-2010-0505-4558.

[12] Ramya Chari, Burke, White & Fox, *Integrating Susceptibility into Environmental Policy: An Analysis of the National Ambient Air Quality Standard for Lead*, 9 Int. J. Environ. Res. Public Health 1077, 1084 (2012).

In order to address current inequities in the burden of environmental pollution, EPA must update its risk assessment policies and guidelines which, as discussed later in these comments, fail to provide health protections by ignoring the cumulative impact of multiple sources and types of pollution, routes of exposure, and individual and population vulnerabilities.

Experts have identified addressing cumulative impacts as essential to ensuring environmental justice and reducing disparities.

EPA has recognized the scientific evidence on socioeconomic stressors and increased vulnerability in guidance documents.[13] EPA also has made an important commitment to finally implement the 1994 Executive Order 12898, issued by President Clinton, without delay, in the form of Plan EJ 2014.[14] In response to public comments on Plan EJ 2014, EPA made the point that cumulative risk assessment should include consideration of environmental justice, stating that "the RAF [Risk Assessment Forum] believes the application of CRA [Cumulative Risk Assessment] to issues of environmental justice is supportable, both now, and increasingly in the near future."[15] In Plan EJ 2014, EPA has recognized the need for a pragmatic approach which uses the best science available now to ensure that EPA finally starts to address the real-world impacts that communities face.[16]

The agency also has recognized that it has a broad range of legal requirements and tools to address and provide environmental justice.[17] To fulfill its commitment on environmental justice, EPA must address and reduce the cumulative impacts and risks caused by environmental hazards in overburdened communities, which are often communities of color and lower income communities.

EPA has acknowledged the importance of addressing multiple source exposures, by stating that it "understands the potential importance of considering an individual's total exposure to HAP [hazardous air pollutants] in addition to considering exposure to HAP emissions from the source category and facility," and that it is "interested in placing source category and facilitywide HAP risks in the context of total HAP risks from all sources combined in the vicinity of each source."[18] And, EPA has also recognized this need in its most recent risk report.[19] Yet, so far EPA has failed to follow through on this in air toxics and other

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[13] *See, e.g.*, Draft Technical Guidance on EJ in Rulemaking at 14-18 (2013).
[14] Plan EJ 2014, http://www.epa.gov/compliance/ej/plan-ej/index.html; Exec. Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," 59 Fed. Reg. 7629 (Feb. 16, 1994), http://www.epa.gov/compliance/ej/resources/policy/exec_order_12898.pdf.
[15] U.S. EPA, "Response to Public Comments on Plan EJ 2014 Strategy and Implementation Plans" at 15 (Public Comments Received: July 2010-Apr. 2011).
[16] *Id.* at 15-16 (explaining that information available should be used along with new science that "constantly expands the range of what is possible").
[17] *See, e.g.*, EPA, Ofc. of Gen. Counsel, Plan EJ 2014 Legal Tools (Dec. 2011), http://www.epa.gov/compliance/ej/resources/policy/plan-ej-2014/ej-legal-tools.pdf.
[18] NESHAP: Mineral Wool Production and Wool Fiberglass Manufacturing, 76 Fed. Reg. 72,770, 72,786 (Nov. 25, 2011).
[19] U.S. EPA, "Concepts, Methods and Data Sources for Cumulative Health Risk Assessment of Multiple Chemicals, Exposures and Effects: A Resource Document," at xxxii (2007), EPA/600/R-06/013F (defining a cumulative risk

rulemakings; although it has looked at a source category as a whole, and it has looked at collocated sources' total "facility-wide risk," it has not assessed total exposure (such as due to exposure to other known toxic sources across the street or within the area where residents are exposed to the source category), and EPA has not used the facility-wide risk number in setting standards.[20] That is why it needs sound guidance from EPA scientists to do so.

To provide equal protection from pollution to all Americans, EPA must recognize and address the disparities in exposure, and the greater harm it can cause, especially due to early-life exposure. EPA must incorporate all aspects of increased exposure and vulnerability into its approach to assess cumulative impacts.[21]

As summarized by Morello-Frosch and colleagues: health disparities, biological and physiological susceptibility, and social vulnerability all combine with environmental exposure inequalities to make the cumulative impact of environmental hazards greater for communities of color and lower income communities.[22] To assess cumulative impacts and gain the information it needs to protect public health in decision-making, EPA must integrate all four elements into its assessment framework, including social conditions and responses. [23]

Addressing the cumulative impact of these combined environmental and social stressors is essential for EPA to finally follow the 2009 recommendations of the National Research Council, National Academy of Sciences ("NAS").[24] As the NAS has recommended, "EPA should compile relevant data related to socioeconomic status (SES), which may serve as a proxy for numerous individual risk factors . . . and may be a more direct measure of vulnerability than could reasonably be assembled by looking at all relevant individual risk factors."[25] The Council has also advised EPA to address and evaluate "background exposures and vulnerability factors," and use "epidemiologic and toxicologic evidence" in its risk assessments.[26]

Finally, EPA's Science Advisory Board has advised EPA of the importance to finally assess the full cumulative impacts. The SAB stated that "RTR assessments will be most useful to decision makers and communities if results are presented in the broader context of aggregate

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assessment as including "aggregate exposures by multiple pathways, media and routes over time, plus combined exposures to multiple contaminants from multiple sources").

[20] *See* examples cited, *supra* note 11.

[21] Peter L. deFur, Evans, Cohen Hubal, Kyle, Morello-Frosch & Williams, *Vulnerability as a Function of Individual and Group Resources in Cumulative Risk Assessment*, 115(5) Environ. Health Perspect. 817 (2007).

[22] Morello-Frosch *et al*., *supra* & Appendix.

[23] *Id.* at 883.

[24] National Research Council, National Academy of Sciences, "Science and Decisions: Advancing Risk Assessment" (2009) ("NAS 2009"), http://www.nap.edu/catalog.php?record_id=12209.

[25] NAS 2009 at 226 (citing O'Neill *et al*., *Health, Wealth, and Air Pollution: Advancing Theory and Methods*, 111(16) Environ. Health Perspect. 1861 (2003)).

[26] NAS 2009 at 221-23 (discussing Menzie *et al*. 2007 model); *id*. at 230 (discussing the role of epidemiology and surveillance data).

and cumulative risks, including background concentrations and contributions from other sources in the area."[27]

In order to fulfill EPA's and the Executive Branch's commitment to environmental justice, EPA must:

(1) Update guidelines for conducting risk-based assessments to incorporate mechanisms for accounting for the cumulative impacts of multiple exposures and underlying vulnerabilities;

and

(2) Move beyond current risk frameworks and incorporate alternate methods to assess health threats from environmental exposures in a way that will better capture the impacts faced by overburdened communities and support policies to reduce them.

[27] Sci. Adv. Bd., Review of EPA's draft entitled, "Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board – Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing,"at ii, 10 (May 2010), EPA-SAB-10-007 ("SAB May 2010").

II. WITHIN THE EXISTING RISK FRAMEWORKS EPA MUST USE THE BEST AVAILABLE SCIENCE TO ADDRESS THE FULL PICTURE OF HARM THAT COMMUNITIES EXPERIENCE FROM POLLUTION.

EPA is currently relying on outdated risk assessment methods that fail to incorporate the current science on the cumulative impacts of environmental exposures and community and individual vulnerability. As part of the development of guidelines for cumulative impacts, EPA must provide direction to those programs relying on outdated methods and develop new methods for conducting these risk assessments so as to provide public health protections.

The National Research Council, National Academy of Sciences has recommended that EPA perform a full "cumulative risk assessment."[28] We urge EPA to fully consider and incorporate the recommendations and information from the NAS, other independent scientists, and the example models from California EPA's Office of Environmental Health Hazard Assessment ("OEHHA"), in order to take immediate steps toward reforming existing practices to better assess cumulative risk and impacts as part of the agency's responsibilities.

As an important example, EPA is currently deciding whether the second generation of the Clean Air Act's air toxics program will bring meaningful protection to communities nationwide. In a set of community health air toxics rulemakings or "CHAT" rules (also known as residual risk standards, under section 112(f) of the Act, 42 U.S.C. § 7412(f)(2)), EPA must set emission limits that protect the people most-exposed to major industrial sources' pollution. EPA must prevent unacceptable health risk and provide an ample margin of safety to protect public health.

EPA can and must vastly improve its approach by updating existing risk assessment guidelines to incorporate the science of cumulative impacts. This should be done by implementing the following:

- Account for individual-level vulnerability in risk assessments by better incorporating the vulnerability of children, early-life exposures, and the developing fetus into risk assessment methods:
    - Account for increased susceptibility by using age-dependent adjustment factors for all carcinogens, not just known mutagens.
    - Pre-natal susceptibility: Account for increased susceptibility by using a pre-natal adjustment factor for all carcinogens of <u>at least 10X.</u>
    - For chronic non-cancer risk, consult and apply child-specific reference

[28] *See e.g.*, NAS 2009 at 224 (describing this as "evaluating an array of stressors (chemical and nonchemical) to characterize—quantitatively to the extent possible—human health or ecologic effects, taking account of such factors as vulnerability and background exposures"); *see also* Cal. EPA, OEHHA, "Cumulative Impacts," *supra*, at 3 (2010) (OEHHA has addressed this issue in terms of a "cumulative impacts" assessment which considers "the exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socio-economic factors, where applicable and to the extent data are available").

values (such as those created by California EPA scientists), where available.

- If child-specific reference values are unavailable, consult science on early exposure impacts, and use an additional default factor of at least 10X.

- Account for community level vulnerability by including factors to account for increased vulnerability based on demographic differences, as part of the risk assessment. EPA also must fully integrate the findings of its environmental justice analyses into its risk assessments and rulemakings, and set stronger pollution limits to provide environmental justice.
- Assess the cumulative burden of exposures to multiple pollutants and sources via multiple pathways:
    - Assess and aggregate exposure from multiple pathways – including by adding inhalation and non-inhalation-based cancer risks.
    - Include the interaction of multiple pollutants.
    - Account for exposure to multiple sources. Until EPA has a specific mechanism for estimating total exposures, a default or uncertainty factor of at least 10X should be used to provide overburdened communities with the protection they need now.
- Account for cumulative impacts of multiple exposures and vulnerabilities by shifting the level of risk which triggers policy action.
    - Reduce EPA's benchmark of what it considers acceptable lifetime cancer risk instead of relying on the outdated upper limit of 100-in-a-million.
    - Use a Margin of Exposure (MOE) framework for non-cancer impacts and adjust the target MOE according to known vulnerability factors.
- In the face of increasing evidence calling into question the assumption of a safe or acceptable level of exposure, EPA should also consider reforming risk assessments to support reducing risks to the lowest possible level, to protect public health, rather than suggesting that there is a safe or acceptable level.

Please see Appendix A for more detail on each of the above-listed issues. Although these have come up in the context of EPA's rulemakings on air toxics standards, many of these represent cross-cutting problems with EPA's risk assessment framework that the agency should address broadly to finally follow current science.

Community Involvement

As a notable, final recommendation on cumulative risk, the NAS also urged EPA to expand "stakeholder involvement" and community outreach in the planning, scoping, and problem formulation of risk assessments, and to better explain and provide information to

affected communities on the considerations and conclusions of risk assessments.[29] EPA's failure to publicize the current notice or contact affected communities to solicit input is a case in point. This is an extremely important issue for communities overburdened by pollution and we urge EPA to engage with communities on this issue as the agency moves toward issuing guidance.

As a general matter, EPA must involve community stakeholders in strengthening its risk assessment approach overall. It is especially necessary for EPA to communicate with and solicit input from local organizations and citizens in communities that will be affected by a given risk assessment. The most-exposed and most-affected people often have helpful information to offer EPA. Importantly, for EPA to fulfill its commitment to environmental justice it also must listen to and engage with affected communities. This means not just publishing something in the Federal Register and on the Internet. It requires EPA to find community members, leaders, and representatives. It requires EPA to make phone calls, to discuss the substantive issues in person and by phone, in a way that allows communities to provide meaningful input. It may require community outreach outside of EPA's usual approach, including translation into the relevant spoken languages, and events to reach affected people in their own communities, after hours and on weekends. As part of its work, EPA should set and achieve goals for both disseminating information, and soliciting broad-based community participation from diverse communities around the United States.

The very short comment deadline on EPA's notice on cumulative risk assessment and the lack of direct outreach from EPA mean that the agency, thus far, has not provided affected communities with a meaningful opportunity to engage in this process. The lack of advance notice and short comment period also have made it difficult for communities to engage with scientists in the academic field. Commenters urge EPA to integrate community involvement and perspectives into this process, and ensure that when draft guidance is proposed that there is sufficient public notice and time for comment.

[29] NAS 2009 at 234-35.

III. EPA MUST MOVE BEYOND CURRENT RISK FRAMEWORKS AND INCORPORATE ALTERNATE METHODS TO ASSESS HEALTH THREATS FROM ENVIRONMENTAL EXPOSURES THAT BETTER CAPTURE AND REDUCE THE IMPACTS FACED BY OVERBURDENED COMMUNITIES.

There is strong evidence that cumulative exposures to environmental contaminants and community and/or individual level susceptibilities increase health threats in communities overburdened by pollution.

These findings show a need both to reform existing risk frameworks in key ways, and to explore alternate mechanisms to assess and reduce the environmental burden in these communities.[30] Scientists have outlined new approaches that focus on health impacts and apply available data and research from the areas of epidemiology, exposure assessment, and environmental justice.[31] EPA's guidance should incorporate these new integrated approaches to address cumulative impacts and identify key ways to implement them such that they inform policy decisions and help reduce contaminant burdens which are threatening community health.

In particular, scientists have called for the incorporation of new "targeted place-based" approaches that identify and assess the cumulative burden of environmental stressors and vulnerabilities in communities, so that decision-makers can provide much-needed regulatory and other actions to better protect public health.[32] Unlike EPA's current risk assessment approach which often contains an implicit assumption of a threshold that can assure safety,[33] this type of approach is geared toward identifying and targeting actions to reduce the environmental threats in communities. EPA can and should use this type of model as a means to target interventions that can decrease the environmental hazards in the most exposed and most vulnerable communities to the greatest extent possible. For communities overburdened by toxic air and other kinds of pollution, a cumulative impact analysis will allow EPA, state regulators, and concerned citizens to have information they need to make decisions about how much to prevent and control current and potential new pollution and other environmental hazards.

Cumulative Impact Assessment Methods

Researchers and agencies have used geospatial analyses of available data on environmental threats and community characteristics to develop tools which can evaluate the relative distribution of contaminant burden. These tools, which can consist of an index or a screening assessment, combine environmental exposures or threats with both individual and community measures of vulnerability to come up with a combined score for a geographical unit

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[30] Morello-Frosch *et al., supra*; James L. Sadd, Pastor, Morello-Frosch, Scoggins & Jesdale, *Playing It Safe: Assessing Cumulative Impact and Social Vulnerability through an Environmental Justice Screening Method in the South Coast Air Basin, California*, 8 Int. J. Environ. Res. Public Health 1441 (2011); Jason Su, Rachel Morello-Frosch, Jesdale, Kyle, Shamasunder & Jerrett, *An Index for Assessing Demographic Inequalities in Cumulative Environmental Hazards with Application to Los Angeles, California*, 43(20) Environ. Sci. Tech. 7626 (2009).
[31] Morello-Frosch *et al., supra* note 5, at 880.
[32] *Id.* at 883.
[33] *See, e.g.*, examples cited, *supra* note 11.

which provides a relative measure of the cumulative impacts compared to other areas included in the analysis.

EPA should apply and adapt a place-based targeting approach, shown by these examples, to assess and score affected communities with multiple listed sources on a cumulative impacts spectrum that includes environmental exposures, hazards, and vulnerability at the individual and community levels. US EPA should then use the cumulative impacts spectrum in all areas of agency decision-making to protect public health.

The California EPA cumulative impacts protocol provides a valuable model for how US EPA can do this.[34] California EPA has performed a targeted, place-based scoring analysis for California communities that could be applied nationwide. For example, the California EPA has outlined the following ways in which the information from the cumulative impacts tool could be used:

> Identification of communities with the highest cumulative impact scores would allow Cal/EPA programs to target them for additional environmental monitoring, increased pollution enforcement activities, or to prioritize them for available incentive programs that reduce emissions or provide clean-up funds. When intra-agency efforts are needed to address multi-media impacts, the application of such a screening tool could assist in identifying impacted areas. This information could be used to target enforcement programs to reduce violations of existing laws and regulations and deter future violations in highly impacted communities. Screening for highly impacted communities could be used to prioritize outreach efforts to communities most in need of financial assistance. This assistance could be used to increase public participation opportunities and other capacity-building efforts.[35]

As additional examples, EPA should consult:

(1) Jason Su, Rachel Morello-Frosch, *et al.*, An Index for Assessing Demographic Inequalities in *Cumulative Environmental Hazards with Application to Los Angeles, California*, 43(20) Environ. Sci. Tech. 7626 (2009), http://pubs.acs.org/doi/abs/10.1021/es901041p.

In this study, researchers offer "a method for creating an index capable of summarizing racial-ethnic and socioeconomic inequalities from the impact of cumulative environmental hazards," and apply this to Los Angeles County. *Id.* The paper focuses on air pollution, including: ambient concentrations of particulate matter, nitrogen dioxide, and estimates of cancer risk associated with modeled estimates for diesel particulate matter. The index proposed "provides a generalized framework that incorporates environmental hazards and socioeconomic

[34] Cal. EPA, OEHHA, California Communities Environmental Health Screening Tool (CalEnviroScreen 1.0) (April 2013), http://oehha.ca.gov/ej/ces042313.html.
[35] George Alexeef, Faust, Meehan August, Milanes, Randles, Zeise & Denton, *A Screening Method for Assessing Cumulative Impacts*, 9 Int. J. Environ. Res. Public Health 648 (2012).

characteristics to assess inequalities in cumulative environmental risks," and as such provides a model for how U.S. EPA should consider and address these same issues. *Id.*

(2) James L. Sadd *et al.*, *Playing It Safe: Assessing Cumulative Impact and Social Vulnerability through an Environmental Justice Screening Method in the South Coast Air Basin, California*, 8 Int. J. Environ. Res. Public Health 1441 (2011); doi:10.3390/ijerph8051441.

In this study, researchers proposed an "Environmental Justice Screening Method (EJSM) as a relatively simple, flexible and transparent way to examine the relative rank of cumulative impacts and social vulnerability within metropolitan regions and determine environmental justice areas based on more than simply the demographics of income and race." They applied 23 indicator metrics, in three main categories: (1) hazard proximity and land use; (2) air pollution exposure and estimated health risk; and (3) social and health vulnerability.

EPA should investigate these and other similar work happening in various states, including New Jersey.

Health Impact Assessment

Health Impact Assessment (HIA) is another tool which has the capacity to combine multiple measures describing diverse hazards with measures of community vulnerability and individual susceptibility. HIA is an approach to assess the human health implications of a proposed plan, project or policy which takes into consideration the existing environmental conditions and community characteristics that can influence health outcomes. As such, the methods developed in the service of conducting HIAs offer tools that can integrate multiple types of data including both quantitative and qualitative.[36] EPA should evaluate where the strategies and approaches of Health Impact Assessments could be incorporated into or added to existing environmental assessments to better capture cumulative threats to public health.

Strong Need for EPA to Address Real-World Cumulative Impacts

The following list provides examples of key EPA programs where affected communities greatly need EPA to gather health impact and demographic information and use an approach that integrates aggregate exposures with underlying vulnerabilities to strengthen policy decision-making.

1. It is urgent for EPA to address cumulative impacts in setting air, pesticides, hazardous waste, and other pollution limits in rulemakings.

EPA should use a scoring approach to guide its rulemakings on a number of important issues that are urgent for public health. EPA's air toxics rules are an area where EPA risk assessment practices have been failing to follow the current science. In addition, to making the

[36] Morello-Frosch *et al.*, *supra*.

essential updates within EPA's current risk assessment approach (as discussed further in Appendix A), EPA should also use the cutting-edge community impact scoring method in at least the following ways.

- After creating the scored spectrum of affected communities nationwide, EPA should incorporate this information into the standard-setting process under various statutes. This would help ensure protections for communities impacted by multiple pollutants and sources that are currently controlled under separate regulations and rules by identifying those areas where tighter pollution controls may be necessary to protect public health. For example, when EPA sets source-specific standards for each source category as required by Clean Air Act section 112, it should also look at other sources and standards to assess their combined community impact. EPA can then set source-specific standards that target that source's contribution in the broader context of its cumulative impact on public health. EPA should engage in a similar approach for other types of pollution that can impact communities, such as pesticides, household chemicals, or hazardous waste sites, under its relevant statutory authorities (e.g., TSCA, FQPA, CERCLA, RCRA, CWA).[37]

- Under the Clean Air Act, and other statutes where EPA is setting standards for a specific source category or type of pollution that emits into a community with multiple sources of pollution, EPA should recognize that the impact of that source's pollution is larger and more harmful because it is emitting in combination with other sources. This is further discussed below in connection with the air toxics standards as an example. (See Appendix A).

2. Permit and Siting Decisions.

EPA must provide protection for communities from the cumulative impacts of all sources located there. When there is a proposal for a new or modified permit or siting change in a community that already faces combined harm from other kinds of pollution, EPA must take that into account. EPA cannot pretend that each new proposed permit or siting decision is occurring in a vacuum.

For example, permitting officials sometimes try to use significant impact levels to obviate the need for multi-source modeling.[38] Similarly, they may try to allow a permit to move forward largely on the rationale that a national ambient air quality standard for a particular criteria pollutant has not been exceeded in the air shed as a whole. These types of permitting approaches do not consider cumulative impacts, including due to vulnerabilities that may exist in a particular community, effectively allowing a permit to go forward without the effective look at local impacts necessary to protect public health.

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[37] *See* EPA, Ofc. of Gen. Counsel, Plan EJ 2014 Legal Tools (Dec. 2011), http://www.epa.gov/compliance/ej/resources/policy/plan-ej-2014/ej-legal-tools.pdf.

[38] *But see Sierra Club v. EPA*, 705 F.3d 458 (D.C. Cir. 2013) (vacating and remanding EPA rules on significant impact levels and significant monitoring concentrations for PM2.5).

Instead, EPA must ensure that the agency and other permitting agencies, including the states, recognize the full impact of pollution that already exists in a community that has other sources of pollution. Cumulative impacts already faced by a community may merit denial of a permit or the requirement to install additional pollution controls, additional monitors, and additional compliance provisions in a permit, such as back-up power, community notification, and corrective steps, like immediate shut-down, that must be taken whenever there is an accident or upset.

3. Enforcement and Monitoring Decisions.

Using a scoring mechanism to assess where a community stands on the spectrum of exposure and vulnerability would be the most efficient way for EPA to target its enforcement and monitoring resources to communities that have the greatest need, based on cumulative impacts and risk from pollution.

EPA regularly makes decisions about how to allocate resources for enforcement and what cases to prosecute. EPA should target its enforcement actions in those communities that are the most overburdened and face the greatest risk from pollution.

Communities need more state-of-the art fenceline monitoring tools and systems set up by EPA near places where people live and children go to school in the midst of pollution and polluting sources.[39] Communities affected by pollution have a right to know what is in their air, water, and soil. Where EPA is unable to or does not bring enforcement cases, affected communities have a particular need for up-to-date information on air emissions, water pollution, and soil and hazardous waste testing. This allows community members and organizations to make decisions locally to try to protect their own health, and to consider bringing citizen enforcement suits, where possible.

Community Spotlight

These comments include stories that provide a snapshot of the experience of local communities around the country that many EPA staff and panel members may never have visited, including from Houston, Midlothian, and Port Arthur, TX, Los Angeles County, CA, Delaware City, DE, Southeast Louisiana, Detroit, MI, Camden, NJ, Washington, D.C., Memphis, TN, Mebane, NC, and the Navajo Nation. The following are excerpts from Appendix E.

Northern Delaware
Amy Roe, Conservation Chair, Sierra Club, Delaware Chapter

> In northern Delaware, where I live, the air is unsafe to breathe. Ozone action days are commonplace and toxic releases from the numerous chemical plants and the nearby oil

[39] *See, e.g.*, USA Today, *The Smokestack Effect: Toxic Air and America's Schools*, http://content.usatoday.com/news/nation/environment/smokestack/index (providing information on schools most exposed to hazardous air pollution around the U.S.).

refinery occur regularly. The groundwater in eastern New Castle County has been contaminated, and just this month a drinking water well near the town of New Castle was closed because of 1,4-dioxane from a nearby Superfund site. The fish in our rivers and streams are unsafe to eat and most of the water bodies in New Castle County have a "no consumption" advisory. We are forced to endure the legacy pollution from past manufacturing and hazardous waste disposal, while new pollutants are added to our environment from existing facilities.

The response that I have received from state regulators for air pollution concerns that made me ill and nauseated during the restart of the Delaware City Refinery was that the "air" I am breathing is just "air." The air that I am breathing is not just air! It is filled with fine particles and toxic vapors from many industrial facilities, including but not limited to the Delaware City Refinery, Formosa Plastics, FMC Biopolymer, AI Dupont Sulfuric Acid Regeneration Plant, Kuehne Chemical Company, DuPont Edgemoor and the DuPont Experimental Station.

This month I learned that my city has been negotiating to build a 248 MW power plant at the edge of my neighborhood, just a few blocks away, and a stone's throw from the playground where I played on the swings as a child. Past and present threats to public health are being added to with plans for future development. The regulatory oversight of air and water pollution needs dramatic improvement. Science-based standards for cumulative risk assessment would result in the dramatic improvement of our lives and health. It would dramatically improve the way that pollution standards are assessed to consider the health impacts to our communities as part of the regulatory process.

Houston Ship Channel, Houston, TX:

Houston's Ship Channel hosts one of the largest concentrations of petrochemical facilities in the world, which in addition to the area's refineries, other chemical facilities, and constant fleets of shipping barges and diesel trucks, contaminates regional air quality. The negative health impacts on the community, which is overwhelmingly Latino, are undeniable. A study of nearly 300 residents by Air Alliance Houston in partnership with Healthy Port Communities Commission conducted between March and April 2013 found that communities near the Port of Houston experience higher than average rates of allergies, cancer, and respiratory illnesses. In comparison to state statistical averages, residents near the Port of Houston reported rates of asthma twice as high in adults and children, and reported rates of cancer ten times as high. Eighty-six percent of respondents expressed concern about pollution from local refineries in the survey, and 89% of respondents expressed concern about the effects of pollution on their health. Problematically, 54% of respondents did not have health insurance and nearly half of residents have an unemployed household member. The combination of high pollution exposure and lower access to health care in this community shows the need for EPA to look at and reduce the cumulative impacts people here face.

Detroit, Michigan:

Michigan's most polluted zip code is 48217, located in the southwest of Detroit.[40] Wedged between a major highway and polluting factories, this community has acutely felt the burden of living so close to industrial plants. The residents experience acrid odors, masses of floating dark particles, and thick layers of metallic dust that settle over the area. The community, which is roughly 85% African American, has experienced deteriorating health due to its proximity to multiple industrial sites.[41] Asthma, sarcoidosis, and multiple types of cancer, including leukemia and brain cancer, have affected many local families. Despite all this, the city continues to allow the industrial sector to expand, further elevating the level of pollution. In the past decade alone, air permits for an asphalt plant have been approved, the nearby water and sewer plant have expanded, and a composting facility was erected. In 2007, the community opposed the $2-billion project to expand the Marathon Refinery and lost. The State asserts that each industrial plant complies with the emissions limits, but the State fails to take into account the cumulative effects of the multiple facilities that are spewing out toxins into the air. Although Detroit has seven state air monitors, none are located in this neighborhood, spurring the local residents to initiate their own sampling. Their results showed high levels of lead and methyl ethyl ketone, a toxin that can irritate the lungs and affect the nervous system, in the air. The cumulative effects of the nearby facilities must be considered for communities like Detroit to account for the level of harm associated with close proximity to these industrial sites and, ultimately, to finally bring relief to communities inundated with pollution.

Cancer Alley, Louisiana:

The 80 mile stretch of Mississippi River between Baton Rouge and New Orleans, once revered by Mark Twain, is now dubbed "Cancer Alley."[42] This Louisiana area has the highest concentration of manufacturers, users, and disposers of toxic chemicals in the nation.[43] Hundreds of industrial plants are located near low-income communities of color and have been spewing out dangerous air toxins for decades.[44] The residents experience high rates of asthma, cardiovascular disease, diabetes, infant mortality, and cancer, including rare childhood cancers.[45]

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[40] Tina Lam, *48217: Life in Michigan's Most Polluted Zip Code*, DETROIT FREE PRESS (June 20, 2010), http://www.freep.com/article/20100620/NEWS05/6200555/48217-Life-Michigan-s-most-polluted-ZIP-code.
[41] Andrea Newell, *Environmental Justice in Detroit: Hope Arises Amid Toxic Communities*, TRIPLE PUNDIT (Jun. 10, 2013), http://www.triplepundit.com/2013/06/detroit-environmental-justice/.
[42] *Cancer Alley, Louisiana*, H2G2, Jul. 4, 2002, http://h2g2.com/approved_entry/A760420 (last updated Dec. 11, 2005).
[43] Heidi E. Kluber, "Cancer Alley and Infant Mortality: Is There a Correlation?" (Dec. 2011) (unpublished M.P.A.F.F. thesis, University of Texas) (on file with University of Texas Libraries), available at http://repositories.lib.utexas.edu/bitstream/handle/2152/ETD-UT-2011-12-4417/KLUBER-MASTERS-REPORT.pdf?sequence=1.
[44] H2G2, *supra*.
[45] Cancer Alley and Infant Mortality, *supra*, at 1.

The reality faced by these and other communities requires EPA's urgent attention to current science. Many additional examples are included in the attached Appendix E, and we urge EPA to consider each of these community stories as part of this review and its development of guidance.

CONCLUSION

We encourage EPA to follow the best available science on cumulative impacts and risk, and to issue strong new guidance on the issues these comments discuss, without delay. Please contact us if we can provide any additional information that would be helpful. Please also let us know what EPA's planned timeframe and next steps are to issue draft guidance, when possible.

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APPENDIX TABLE OF CONTENTS:

APPENDIX A: SPECIFIC RECOMMENDATIONS TO REFORM EXISTING RISK ASSESSMENT GUIDELINES

I. ACCOUNT FOR INDIVIDUAL-LEVEL VULNERABILITY IN RISK ASSESSMENTS BY BETTER INCORPORATING THE VULNERABILITY OF CHILDREN, EARLY-LIFE EXPOSURES, AND THE DEVELOPING FETUS INTO RISK ASSESSMENT METHODS.

The National Academy of Sciences ("NAS") reports and other new scientific and policy developments direct that EPA must better account for vulnerability and variability. *See* Appendix B-C. In particular, the science is now clear that "children are not 'little adults'" when it comes to toxic chemicals.[46] They are both susceptible to greater harm from exposure to toxic chemicals, because they are still growing and developing, *and* they are exposed to such chemicals at a greater rate than adults because of age-specific behaviors and physiological characteristics. Second, EPA must also better account for other types of human variability because some people exposed to the same amount of a pollutant experience greater health risk due to other factors, such as genetics and baseline health status. Socioeconomic status has been shown to act as a proxy for other types of human variability to chemical risk that EPA has not adequately addressed in its risk assessments.

This section discusses key ways in which EPA must better address both the greater risk to children (including from early-in-life exposure to toxic chemicals), and other important types of human variability. Appendix B and C of this document summarize the significant body of scientific and policy developments on children's health and environmental justice which illustrates the need for updates to EPA's risk assessment approach.

A. Children's Risk and Early-Life Exposures

1. Account for increased early life susceptibility by using age-dependent adjustment factors for all carcinogens.

Most of EPA's cancer risk assessments do not account for early-life exposure or the greater risk to and susceptibility of children. For cancer risk assessment, EPA should follow the science and account for increased early-life susceptibility by applying age-dependent adjustment factors for *all carcinogens* emitted by a source category.

In past rulemakings, EPA has restricted its application of age-dependent adjustment factors, as discussed in the 2005 *Guidelines* and *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*, to those hazardous air pollutants ("HAPs") included in EPA's list of carcinogens that act by a mutagenic mode of action.[47] It

[46] National Research Council, "Pesticides in the Diets of Infants and Children" at 3 (1993).
[47] *See* EPA, "Guidelines for Carcinogen Risk Assessment," EPA/630/P-03/001F, at 1-19 to 1-20 (Mar. 2005), http://www.epa.gov/raf/publications/pdfs/CANCER_GUIDELINES_FINAL_3-25-05.PDF; EPA, "Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens," EPA/630/R-03/003F (2005), http://www.epa.gov/raf/publications/pdfs/childrens_supplement_final.pdf; *see, e.g.*, EPA OAQPS, "National

therefore has not applied age-dependent adjustment factors to assess cancer risk from all of the carcinogens emitted by a source category. The NAS recognized this as a "missing" default in EPA's approach that it should address and account for.[48]

Instead of taking the approach of the 2005 *Guidelines* and *Supplemental Guidance* to limit the use of age-dependent adjustment factors to only some carcinogens, EPA must follow the lead of OEHHA by using age-dependent adjustment factors for all carcinogens.[49] Because OEHHA has provided robust scientific support for this approach, using these factors to assess cancer risk for all carcinogens would be consistent with the NAS recommendations. As the NAS explained: "EPA needs methods for explicitly considering in cancer risk assessment . . . chemicals that do not meet the threshold of evidence that the agency is considering for judging whether a chemical has a mutagenic mode of action . . . . Special attention should be given to hormonally active compounds and genotoxic chemicals that do not meet the threshold of evidence requirements."[50]

The 2005 Guidelines recognized that updates would be needed if more data become available.[51] Now that such data are available, including from the NAS and OEHHA, the agency must update its approach promptly. EPA should immediately implement the OEHHA age-dependent adjustment factors for all carcinogens, and EPA should also update the 2005 Guidelines to fully reflect current science as described in OEHHA's 2009 review of the scientific literature on increased susceptibility to carcinogens from early life exposures.[52]

2. Pre-natal susceptibility: Account for increased susceptibility to pre-natal exposures by using pre-natal adjustment factors for all carcinogens.

Current EPA risk assessment procedures do not take into account increased susceptibility to carcinogens due to pre-natal exposures. The 2005 Supplemental Guidance recognized the scientific findings of increased susceptibility to carcinogens resulting from pre-natal exposure, but did not develop adjustment factors to account for increased cancer risk resulting from pre-natal exposures.[53] For example, EPA recognized that "[e]xposures that are of concern extend from conception through adolescence and also include pre-conception exposures of both

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Emissions Standards for Hazardous Air Pollutants: Secondary Lead Smelters, Summary of Public Comments and Responses," at 72-73 (11-14-11), EPA-HQ-OAR-2011-0344-0167.

[48] NAS 2009 at 196 (Tbl. 6-3 - Examples of "Missing" Defaults in EPA "Default" Dose-Response Assessments).

[49] Cal. EPA, OEHHA, "Technical Support Document for Cancer Potency Factors: Methodologies for Derivation, Listing of Available Values, and Adjustments to Allow for Early Life Stage Exposures" 3-4, 50-51 (May 2009), http://www.oehha.ca.gov/air/hot_spots/2009/TSDCancerPotency.pdf, and http://oehha.ca.gov/air/hot_spots/tsd052909.html.

[50] NAS 2009 at 112 (ch. 4) (describing the fact that "*in utero* periods and nonmutagenic chemicals were not covered" by EPA's 2005 guidelines, as significant omissions).

[51] *See* EPA, 2005 Supp. Guidance at 21, 31 ("EPA expects to expand this Supplemental Guidance to specifically address modes of action other than mutagenicity when sufficient data are available and analyzed.").

[52] Cal. EPA, OEHHA, TSD for Cancer Potency Factors, *supra* note 49.

[53] EPA, 2005 Supp. Guidance at 4-5, 14 & tbl. 1a (A-1) (discussing research on human and animal cancer risks from prenatal exposure).

parents."[54] The NAS identified the lack of accounting for "*in utero* periods" of exposure as a major omission in EPA's 2005 cancer guidelines.[55]

OEHHA conducted its own review of the scientific literature to account for pre-natal susceptibility and exposures, which EPA should also consult and use.[56] It has also developed methods and adjustment factors to account for pre-natal susceptibility and exposures that EPA should use.[57] In its new risk assessment guidelines, OEHHA includes procedures for exposure assessment during fetal development, which EPA should evaluate.[58] OEHHA specifically discusses the use of a 10X adjustment factor for cancer risk due to pre-natal to age 2 exposures, and EPA should consider using at least this same factor.[59]

EPA should consult the science OEHHA has used to develop this well-supported factor, and should then use at least a 10X adjustment factor for all carcinogens to assess health risk due to pre-natal exposure.

3. For chronic non-cancer risk, consult and apply child-specific reference values, where available.

Most of EPA's IRIS toxicity threshold values (reference concentrations and reference doses) used for chronic non-cancer risk assessment do not incorporate the latest science on increased susceptibility of children.[60] EPA needs to account for early exposure and the greater risk to and susceptibility of children in its risk assessments.

OEHHA child-specific health values include reference doses for cadmium, chlordane, heptachlor, manganese, methoxychlor, nickel, and pentachlorophenol, and a benchmark for lead. A full list, with links to each scientific determination document, is available here: OEHHA, Table of all child-chRDs Finalized to Date (last updated 06/22/09), http://oehha.ca.gov/public_info/public/kids/chrdtable.html. OEHHA has generated these child-specific reference values based on the latest science to take into account children's greater

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[54] EPA 2005 Guidelines for Carcinogen Risk Assessment, EPA/630/P-03/001F, at 1-16.

[55] NAS 2009 at 112-13; *see also id.* at 112, 196 (noting that it is a "missing" default that EPA recognizes in utero carcinogenic activity, but fails to take account of it or calculate any risk for it as "EPA treats the prenatal period as devoid of sensitivity to carcinogenicity").

[56] *See* Cal. EPA, OEHHA, "Technical Support," *supra* note 49, App. J: "In Utero and Early Life Susceptibility to Carcinogens: The Derivation of Age-at-Exposure Sensitivity Measures" – conducted by OEHHA's Reproductive and Cancer Hazard Assessment Branch," .http://oehha.ca.gov/air/hot_spots/2009/AppendixJEarly.pdf.

[57] *Id.* App. J at 7-8 & tbl. 1.

[58] *See* Cal. EPA, OEHHA, Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis, Scientific Panel Review Draft at 1-6 to 1-7 (Feb. 2012) ("OEHHA 2012 Guidelines").

[59] *See id.*

[60] OEHHA has explained why child-specific reference doses or values are needed and provided a list of chemicals. *See, e.g.*, Cal. EPA, OEHHA, "Prioritization of Toxic Air Contaminants - Children's Environmental Health Protection Act" (Oct. 2001), http://oehha.ca.gov/air/toxic_contaminants/pdf_zip/SB25%20TAC%20prioritization.pdf; Cal. EPA, OEHHA, "Development of Health Criteria for School Site Risk Assessment Pursuant to Health and Safety Code 901(g): Identification of Potential Chemical Contaminants of Concern at California School Sites, Final Report" (June 2002), http://oehha.ca.gov/public_info/public/kids/pdf/ChildHealthreport60702.pdf.

exposure and greater vulnerability.

At least until the IRIS values fully account for the increased risk caused by early-life exposure to an emitted pollutant, EPA should use the OEHHA child-specific reference doses or benchmarks available to assess chronic non-cancer health risk from ingestion for certain pollutants. EPA should also assess such risk from inhalation by using standard methods to translate these values into child-specific reference concentrations to assess inhalation-based risk.

4. Where child-specific reference values are unavailable, consult science on early exposure impacts and use an additional default or uncertainty factor.

The increased susceptibility of children, while known to exist, has not been quantified for many toxic chemicals. Until EPA has child-specific or child-based reference values available for a given pollutant, EPA should apply a default or uncertainty factor of at least 10 to account for increased risk from early-life exposures for non-cancer risk assessments.

This would be consistent with the NAS recommendation on the need for EPA to use default factors to account for greater risk,[61] with the science developed and considered by OEHHA, and with the 10X factor enacted by Congress in the Food Quality Protection Act. Specifically, as the SAB report explained:

> California EPA/OEHHA has determined that inhalation dosimetry for children is sufficiently different from adults to warrant a full 10-fold intra-individual pharmacokinetic uncertainty factor (i.e., an extra 3-fold PK uncertainty for children relative to the IRIS method) as a default approach. In setting non-cancer reference exposure levels (RELs), Cal EPA/OEHHA also considers that children may be outliers in terms of chemical susceptibility and on a case-specific basis adds a children's pharmacodynamic factor of 3-fold, making the inhalation risk for children as much as 10 times greater than adults[62]

In addition, Congress has recognized this science in its unanimous vote on toxics legislation passed in 1996 – the Food Quality Protection Act ("FQPA") – in which Congress found the need to use and enacted a Ten-fold Margin of Safety, or "10X factor." Specifically, the Act provides that "an additional tenfold margin of safety for the pesticide chemical residue and other sources of exposure shall be applied for infants and children to take into account potential pre- and post-natal toxicity and completeness of the data with respect to exposure and toxicity to infants and children."[63] Congress's recognition of the need to use this default factor provides a model that EPA should consider and incorporate into residual risk assessments. It

[61] NAS 2009 at 190-93, 203.
[62] SAB May 2010 at 34 (May 2010) (citing Cal. EPA, OEHHA, "Technical Support," *supra*.)
[63] 21 U.S.C. § 346a(b)(2)(C) (requiring that, in establishing, modifying, leaving in effect, or revoking a tolerance or exemption for a pesticide chemical residue, "for purposes of clause (ii)(I) an additional tenfold margin of safety for the pesticide chemical residue and other sources of exposure shall be applied" to protect infants and children).

would be appropriate and within EPA's authority under the Clean Air Act section 112(f)(2) to determine that EPA must similarly use a children's ten-fold margin of safety factor here, consistent with the Clean Air Act's "margin of safety" requirement.[64] In doing so, EPA may rely directly on the science itself, and also on the unanimous guidance from Congress, provided in the FQPA, that the existing evidence of increased harm requires significant action to protect children from toxic exposure.

Further, the child-specific reference doses that OEHHA has created for some pollutants provide support for the use of an additional Ten-fold Margin of Safety Factor. EPA's current reference values are generally one order of magnitude less protective (*i.e.*, larger) than the values that California has recognized as needed to protect children, based on the currently available science and a specific assessment of research relevant to early life exposures, as shown in the chart attached as Appendix D.

B. Account for community level vulnerability by including factors to account for increased vulnerability based on demographic differences, as part of the risk assessment.

The NAS report identified significant flaws in EPA's assessment of individual variability in risk assessments that could result in significant underestimation of risk. In particular, EPA must fully account for the fact that people can be more vulnerable to toxic pollution due to various physiological, societal, demographic, and exposure history differences and can therefore experience greater health risk from the same amount of a toxic chemical exposure.[65] As the NAS has observed, performing risk assessment that is meaningful for communities that already face a significant amount of pollution and communities concerned about environmental justice "requires an ability to evaluate multiple agents or stressors simultaneously—to consider exposures not in isolation but in the context of other community exposures and risk factors."[66] Addressing this issue is particularly important for EPA because of the need to consider and address environmental justice as mandated by Exec. Order 12898.

Communities that have minority and lower income populations and communities with higher than average levels of cancer, respiratory, and other health problems, as well as a lack of access to health care, are likely to be more vulnerable to the impact of toxic air pollution.[67] Where a rule affects communities that are disproportionately minority or lower income, EPA

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[64] 42 U.S.C. § 7412(f)(2).

[65] *See, e.g.*, NAS 2009 at 135-39, 145-51 (explaining that "[h]ow the population responds to chemical insults depends on individual responses, which vary among individuals"; and "[i]f the sensitive people constitute a distinct group either because of their numbers or because of identifiable characteristics—such as ethnicity, genetic polymorphism, functional or health status, or disease—they should be considered for separate treatment in the overall risk assessment"); *id.* at 112 (noting that EPA's guidelines do not address variability due to factors "such as age, ethnic group, socioeconomic status, or other attributes," and explaining that "there is a need for a nonzero default to address the variation in the population expected in the absence of chemical-specific data"); *see also id*. at 134 (discussing various factors and recommending that "much more emphasis needs to be placed on describing the ranges of susceptibility and risk"); *see also id.* at 177-82, 196.

[66] *Id*. at 214-15.

[67] *See, e.g.*, Chari *et al*., *Integrating Susceptibility*, at 1078 & nn.5-10 (citing research); *see also* Cal. EPA, OEHHA, "Cumulative Impacts,"*supra*, at 6, 10, 12-17.

cannot ignore this greater risk in its assessment. As a key starting point, EPA must assess the greater health risk based on socioeconomic status found in epidemiological research studies.[68] As the NAS recognized, "there is growing epidemiologic evidence of interactions between environmental stressors and place-based and individual-based psychosocial stressors, driven in part by the spatial and demographic concordance between physical and chemical environmental exposures and socioeconomic stressors," and there is also a growing field of information on social epidemiology, which addresses the relationship between social factors and disease in human populations.[69] Data describing these factors are available from the Center for Disease Control's Environmental Public Health Tracking ("EPHT") Program, the U.S. Agency for Toxic Substances and Disease Registry, state and local health agencies, and academic researchers,[70] and EPA must consider and use such information in its risk assessments.

Further, EPA must recognize and evaluate the need to consider socioeconomic factors not only as part of an environmental justice analysis, but also as part of EPA's consideration of both vulnerability and variability, as core elements of the risk assessment itself. EPA has been assessing the demographics of affected communities, pursuant to CAA § 112(f) and the Environmental Justice Executive Order 12898.[71] This is necessary and important to continue. However, in addition to looking at the demographic census data on race, ethnicity, poverty level, and similar factors, EPA must also assess the starting point or baseline overall health status of the affected individuals and communities using the best available data at a local and national level, including the baseline cancer levels, respiratory problems, and health problems associated with the toxic chemicals emitted by a source category. Doing so would be consistent with the 1999 Residual Risk Report.[72] Further, EPA has significant research available on which it must draw to incorporate "overall health" into its risk assessments. For example, the American Lung Association has published research showing that African Americans are at a much higher risk of lung cancer than white Americans, and that African-American men have a 37 percent higher risk of lung cancer than white men.[73] EPA must collect and consider this type of health information as part of each risk assessment that disproportionately affects particular minority groups and communities.

Thus far, EPA has failed to adequately assess human variability, particularly the

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[68] NAS 2009 at 109-10 & tbl. 4-1 (describing the need to consider increased susceptibility due to prior and concurrent exposures; and to "social and economic factors"); *id.* at 220-21 (describing ways to assess cumulative risk including by consideration of "epidemiologic concepts" and information, and by considering "what the burden of disease is in the context of simultaneous exposure to a number of stressors"); *id.* at 230 (discussing the role of epidemiology and surveillance data).

[69] *Id.* at 230-33.

[70] *Id.* at 232 (describing data available on health status, and patterns of diseases and exposures).

[71] Exec. Order 12898, "Federal Actions To Address Environmental Justice," *supra*.

[72] U.S. EPA, "Residual Risk Report to Congress" at 42, 67 (Mar. 1999), EPA-453/R-99-00 (discussing factor of "overall health" and recognizing the need to consider sensitive subpopulations that "consist of a specific set of individuals who are particularly susceptible to adverse health effects because of physiological (e.g., age, gender, pre-existing conditions), socioeconomic (e.g., nutrition), or demographic variables, or significantly greater levels of exposure," based on various demographic factors).

[73] Am. Lung Ass'n, "Too Many Cases, Too Many Deaths: Lung Cancer in African Americans" at 1 (2010), http://www.lungusa.org/assets/documents/publications/lung-disease-data/ala-lung-cancer-in-african.pdf (explaining higher risk to African Americans even though primary factor for lung cancer, *i.e.*, cigarette smoke exposure, is lower than for whites); *see also* State of Lung Disease in Diverse Communities: 2010, available at www.LungUSA.org.

increased vulnerability of different socioeconomic groups, or to incorporate the information gained from the environmental justice analysis into its risk assessment. As a typical example of how EPA has handled this issue in many recent rulemakings, in promulgating the Secondary Lead Smelting air toxics rule, EPA recognized that there are greater impacts on communities of color and lower income communities.[74] However, EPA did not incorporate the additional vulnerability this represents at all into its risk assessment.[75] As the NAS discussed, "EPA should compile relevant data related to socioeconomic status (SES), which may serve as a proxy for numerous individual risk factors . . . and may be a more direct measure of vulnerability than could reasonably be assembled by looking at all relevant individual risk factors."[76] EPA should follow the NAS recommendations and science to do so in its residual risk assessments.

In addition, EPA should simply develop and use a default factor to account for socioeconomic and other community-based stressors, just as it does to account for intrinsic biological factors.[77] For example, it traditionally uses a factor of 100 to account for the use of animal studies, when translating such studies to assess human impacts. The Food Quality Protection Act directed EPA to use a factor of 10 to account for in utero exposure. California's Office of Environmental Health Hazard Assessment uses a similar factor to account for in utero exposure. EPA also uses age-dependent adjustment factors in other contexts. EPA should do the same to account for increased vulnerability based on socioeconomic factors or the presence of multiple sources to which a community is exposed.

II. ASSESS THE CUMULATIVE BURDEN OF EXPOSURES TO MULTIPLE POLLUTANTS AND SOURCES VIA MULTIPLE PATHWAYS

A. Perform multipathway assessment for all persistent and all bioaccumulative pollutants.

EPA must assess multipathway (*i.e.*, non-inhalation) risk for all metals and all other pollutants with a persistent or bioaccumulative impact, as OEHHA does. Instead, EPA generally restricts its multipathway risk screening assessment to only those contaminants identified in the 2003 Risk Assessment Guidance as being both persistent and bioaccumulative in the

[74] EC/R Memo, Prepared for EPA, "Risk and Technology Review - Final Analysis of Socio-Economic Factors for Populations Living Near Secondary Lead Smelting Facilities at 9-10" (Dec. 2011), EPA-HQ-OAR-2011-0344-0161 (finding minority population facing an elevated cancer risk due to secondary lead smelters' emissions was more than one-and-a-half times higher than the national minority percentage; Hispanic was 3 times higher than national; "Other and Multi-Racial" was three times higher than national; and lower income measures were also higher) (also describing disproportionate exposure of Hispanics).

[75] EPA, OAQPS, "Residual Risk Assessment for the Secondary Lead Smelting Source Category" (Dec. 2011), EPA-HQ-OAR-2011-0344-0160 (not addressing vulnerability or disproportionate socioeconomic impact in the health risk assessment); National Emissions Standards for Hazardous Air Pollutants From Secondary Lead Smelting, 77 Fed. Reg. 556, 579 (Jan. 2012) (not describing any action EPA took in view of disproportionate effect of source category's pollution, and stating only that the rule "increases the level of environmental protection for all affected populations").

[76] NAS 2009 at 226 (citing O'Neill *et al*. (2003)).

[77] Morello-Frosch *et al.*, *supra* note 4, at 883.

environment (*i.e.*, PB-HAPs).[78] EPA's 2003 list of 14 PB-HAPs is incomplete, however, because it ignores other HAPs which present a multipathway risk.[79]

EPA's choice to restrict its analysis to only certain contaminants that bioaccumulate is not supported by the 2003 Guidance which states that "multipathway risk assessment may be appropriate generally when air toxics that persist and which also *may* bioaccumulate and/or biomagnify are present in releases."[80] This guidance does not direct that the multipathway assessment be limited to only those contaminants listed as PB-HAPs, but that is how EPA has applied it. The choice to exclude those contaminants which persist and accumulate in soils underestimates risks from HAPs. The 2003 guidance document recognized deposition of *persistent* HAPs as a source of soil contamination presenting a potentially significant route of exposure, particularly for children.[81]

Based on EPA's own guidance, and based on recent scientific information compiled by OEHHA, EPA must perform a full multipathway risk assessment for all metals. California OEHHA has recommended a multipathway assessment for metals based on scientific research.[82] EPA should consider and apply this science in its risk assessments.

EPA simply may not assume that the ingestion and other multipathway risks are zero for persistent pollutants when science shows otherwise. The failure to assess multipathway risk from exposure to all PB-HAPs, both individually and cumulatively, results in an underestimate of the health risks of HAP emissions.

The following is a list of top priority pollutants for EPA to add to its list of 14 chemicals for which multipathway risk should be evaluated. These chemicals have been shown to have a significant potential for deposition and retention within the environment. Air emissions of these compounds therefore present a risk to nearby communities via dermal, ingestion, and other non-inhalation pathways that are currently not being considered in residual risk assessments. For extensive documentation on the rationale for multipathway analysis for these compounds and multipathway exposure parameters please review the OEHHA 2012 Guidelines for Exposure Assessment.[83]

i. Arsenic
ii. Hexavalent chromium
iii. Nickel
iv. Diethylhexylphthalate
v. Beryllium

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[78] *See, e.g.*, "Draft Residual Risk Assessment for the Ferroalloys Source Category" (Oct. 2011) at 10, EPA-HQ-OAR-2010-0895-0046 (only analyzing multipathway risk for pollutants on EPA's outdated PB-HAP list even though arsenic is a persistent pollutant and is also emitted).
[79] EPA, "PB-HAP Compounds, Risk Assessment and Modeling – Air Toxics Risk Assessment Reference Library, Vol. I Tech. Resource Manual, Ch. 4 Air Toxics: Chemicals, Sources, and Emissions Inventories," at 4-10, Exhibit 4-2 (2003), http://www.epa.gov/ttn/fera/risk_atra_vol1.html; http://www.epa.gov/ttn/fera1risk_atra_vol 1.html.
[80] *Id*., Part III, Ch. 14"Human Health Risk Assessment: Multipathway," at 14-1(emphasis added).
[81] *Id.* ch. 20.
[82] OEHAA 2012 Guidelines, Appendix E, at E-5, E-10 to E-12, http://oehha.ca.gov/air/hot_spots/SRP/index.html.
[83] *Id.* App. E.

vi. Selenium

In addition to these six listed by OEHHA, we also urge EPA to assess the persistent effects of manganese and naphthalene and add these to the PBT list for similar reasons. Manganese is a pollutant to which children have particular exposure and vulnerability, and there is evidence that it can pose a multipathway risk due to elevated levels in soils around major emission sources.[84] Naphthalene is a polycyclic aromatic hydrocarbon (PAH) and as such must be considered in the POM category which is listed as a PB HAP. Naphthalene has been demonstrated to be persistent and to bioaccumulate in biota, particularly shellfish.[85]

2. Perform multipathway assessment for all pathways of exposure, including those that particularly affect children.

EPA should recognize that the science shows *additional pathways* that it has not addressed for certain pollutants, for which it does recognize the need for a multipathway assessment. For example, OEHHA has recognized that breast milk exposure can be a pathway that creates health risk due to lead.[86] EPA should evaluate the research on various pathways of toxic exposure discussed by OEHHA.

In addition, science shows that EPA has been relying on outdated estimates of incidental soil ingestion exposures and EPA must update these values to ensure that it considers the urban child scenario in its multipathway risk assessment.[87] Risk assessments of exposure to soil contaminants should evaluate both direct exposure, hand-to-mouth, and indirect, object-to-mouth exposure. Indirect hand-to-mouth activity is the exposure from young children who touch an object or food with soil contaminated hands and then put that object or food into their mouths. Published studies show that there is noticeable indirect hand-to-mouth activity in infants and children. In fact, one study found that, on average, a toddler will touch an object and then put that object into his or her mouth 15 times in one hour. At the high end of the study's

[84] *See, e.g.*, ATSDR, "Draft Toxicological Profile for Manganese" at 12 (Sept. 2012) ("Manganese concentrations in soil may be elevated when the soil is in close proximity to a mining source or industry using manganese and may therefore pose a risk of excess exposure to children who ingest contaminated soil.") http://www.atsdr.cdc.gov/ToxProfiles/tp151.pdf ; *see also* Cal. EPA, OEHHA, "Development of Health Criteria for School Site Risk Assessment Pursuant to Health and Safety Code Section 901(g): Child-Specific Reference Doses (chRDs) for School Site Risk Assessment: Manganese and Pentachlorophenol," at 10 (June 2006) (discussing science showing that manganese can accumulate in the brain and showing that ingestion of high levels of manganese is associated with harm).

[85] R. Yender *et al.*, NOAA, "Managing Seafood Safety after an Oil Spill," (Nov. 2002).

[86] OEHHA 2012 Guidelines, *supra* note 58, App. E, at E-12, tbl. E3.

[87] As an additional problem, California's lead in soil standard is more stringent than EPA's due to more recent science on the harm of lead exposure. EPA has recognized that its standard is based on out-dated information about lead, that previously assumed children's blood-lead levels below 10.0 ug/dL was safe. EPA now admits that number is not protective, but has not updated its soil standard. *See, e.g.*, "EPA fails to revise key lead-poisoning hazard standards," USA Today (Mar. 10, 2013), http://www.usatoday.com/story/news/nation/2013/03/10/epa-has-not-revised-lead-hazard-standards-for-dust-and-soil/1971209 ("The EPA has not revised key hazard standards that protect children from lead poisoning since 2001, despite science showing harms at far lower levels of exposure than previously believed."); Children's Health Advisory Protection Comm., Letter to Administrator Jackson Regarding Childhood Lead Poisoning (Mar. 29, 2012), http://yosemite.epa.gov/ochp/ochpweb.nsf/content/chpac_childhood_lead_poison_letter.htm.

distribution (90th percentile), that rate rises to 66 times per hour.[88] This same study found a statistically significant positive correlation between the frequency of object or food in mouth activity and blood lead levels. The 2011 update to EPA's Exposure Factors Handbook includes more recent studies and estimates of hand-to-mouth behavior, which must be used to assess risks from exposures to contaminated soils.[89]

3. Better account for the aggregate impact of inhalation and multipathway cancer and chronic non-cancer risk by adding each type of similar risk together for all pollutants.

The purpose of the multipathway assessment is to allow EPA to look overall at a person's exposure – not just inhalation, and not just other exposure pathways, in isolation. To do so, EPA must add inhalation and multipathway risk. Failing to add up each type of risk in order to come up with a *total* cancer risk number and a *total* non-cancer number, and then (as further discussed below), a *cumulative* burden metric makes EPA's overall risk assessment incomplete.

A major problem in past risk assessments is that EPA does a screening exercise for multipathway risk and then often decides not to do a full multipathway risk assessment.[90] This is problematic for two reasons. First, it withholds information from the public on the amount of non-inhalation risk. Second, it hampers EPA's ability to perform a full, cumulative analysis taking into account all the relevant exposures. EPA should ensure that for each risk assessment it fully assesses multipathway or non-inhalation risk, and that it also combines this with inhalation risk, to come up with a cumulative risk level that EPA and the public can then analyze in the rulemaking process.

B. Include Multiple Pollutants.

1. Assess the combined total of each type of risk for multiple pollutants.

EPA must assess the total and synergistic cancer risk and total chronic non-cancer risk for different pollutants. For example, as OEHHA found, "[t]he potential neurotoxicity of arsenic in children, possibly in combination with other environmental agents, is also a concern. Studies in mice (Meija et al., 1997) indicate combined effects of lead and arsenic on the central nervous system that were not observed with either metal alone."[91]

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[88] Ko, S., Schaefer *et al*., *Relationships of Video Assessments of Touching and Mouthing Behaviors During Outdoor Play in Urban Residential Yards to Parental Perceptions of Child Behaviors and Blood Lead Levels*, 17 J. of Exposure Science and Environ. Epidemiology 47 (2007).

[89] EPA, Exposure Factors Handbook, 2011 Edition (http://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252).

[90] "Draft Residual Risk Assessment for the Ferroalloys Source Category" (Oct. 2011) at 27-31, EPA-HQ-OAR-2010-0895-0046 (although the screening analysis showed mercury levels that were 4 times EPA's screening threshold and POM levels that were 60 times EPA's screening threshold, EPA did not perform a full multipathway analysis or add the multipathway risks to the inhalation risks for POM, which EPA also identified as an inhalation-based cancer risk driver).

[91] Cal. EPA, OEHHA, "Prioritization of Toxic Air Contaminants - Children's Environmental Health Protection Act, Arsenic and Arsenic Compounds" at Arsenic-2 (Part II) (Oct. 2001).

In addition, EPA evaluates total cancer risk (using the maximum individual risk or "MIR") and chronic non-cancer risk (using the target-organ specific hazard index "TOSHI") based on the combined exposure to pollutants with a common health impact.[92] EPA should apply these same principles to create a mechanism for assessing the total acute risk to chemical mixtures, such as a TOSHI, that aggregates the acute impacts on the same organ systems for all pollutants.

2. Assess the total cumulative risk burden from all pollutants.

EPA must create a metric to assess the total and cumulative risk burden, rather than only looking at each type of risk in a discrete, separate way.[93] EPA should be integrating its assessments and performing a "comprehensive risk assessment" as the NAS has emphasized.[94] After first assessing the total cancer, chronic non-cancer, and acute risks, for both inhalation and multipathway exposure, EPA also must create a metric to assess the total bundle of risks.[95] EPA must aggregate health risk for each pollutant, and each type of health risk, to create a cumulative risk determination for the individual "most exposed" to emissions as the Act requires.[96]

Unless and until EPA creates a combined health risk metric, it is unclear how it can make an ample margin of safety determination that is based on the full picture of health risk for a source category and that can be compared to other source categories. EPA must assess the full cumulative burden for public health. By failing to perform a full, cumulative risk assessment, EPA fails to gather the information needed to assess whether the risk to public health is acceptable under CAA § 112(f)(2).

C. Account for Multiple Sources.

EPA must assess and account for the cumulative impact and risk caused by exposure to multiple source categories' toxic air emissions. In many communities containing sources of toxic air emissions, there are many other nearby sources of toxic air emissions within the 3, 5, 10, and the full 50 km radius of EPA's residual risk assessment. Such exposures increase the vulnerability of a community to new and additional toxic air emissions, as discussed in Part I.E, above.[97] Further, EPA's own environmental justice analysis has found that sources of toxic air pollution listed under CAA section 112, such as lead smelters, chromium electroplaters, and many others frequently create disproportionate health risk for minority and lower income communities. This problem is exacerbated by the fact that multiple sources of pollution are more

[92] *See, e.g.*, EPA, OAQPS, "Residual Risk Assessment for the Secondary Lead Smelting Source Category" at 26 (Dec. 2011), EPA-HQ-OAR-2011-0344-0160.
[93] *See, e.g.*, NAS 2009 at 177 ("The underlying scientific and risk-management considerations point to the need for unification of cancer and noncancer approaches in which chemicals are put into a common analytic framework regardless of type of outcome.").
[94] *Id.* at 131; *see also id.* at 132-33 (discussing related issues).
[95] Cal. EPA, OEHHA, "Cumulative Impacts," *supra* at 19-21, 25 (describing total "pollution burden" as sum of exposures, public health effects, and environmental effects); EPA, "Concepts, Methods and Data Sources," *supra*, at 4-42 to 4-46.
[96] 42 U.S.C. § 7412(f)(2).
[97] *See, e.g.*, NAS 2009 at 214.

likely to be more concentrated in minority and lower income communities, creating a serious environmental justice problem.[98]

Therefore, in addition to performing a cumulative assessment from each source category alone, EPA also must perform a cumulative analysis that considers source categories' individual impact and risk with that of other sources to which people are exposed.[99] EPA has acknowledged the importance of addressing multiple source exposures, by stating that it "understands the potential importance of considering an individual's total exposure to HAP in addition to considering exposure to HAP emissions from the source category and facility," and that it is "interested in placing source category and facility-wide HAP risks in the context of total HAP risks from all sources combined in the vicinity of each source."[100] And, EPA has also recognized this need in its recent risk report.[101] Yet, so far EPA has failed to follow through on this. Although EPA has looked at all sources within a source category, it generally has not looked at other exposures. Although EPA has calculated what it calls "facility-wide" risk for different sources collocated at the same address, it has not used that number to set standards, and it has ignored different sources across the street or in close proximity.[102]

EPA's failure to assess the combined, cumulative impact on health risk from multiple pollution source categories conflicts with the recommendation from the Scientific Advisory Board that in May 2010 urged EPA to incorporate cumulative risk into its residual risk analysis. The SAB stated that "RTR assessments will be most useful to decision makers and communities if results are presented in the broader context of aggregate and cumulative risks, including background concentrations and contributions from other sources in the area."[103]

To perform a cumulative risk or impact analysis, EPA should combine current baseline emissions, exposures, and health impacts in addition to those of the specific source category EPA is reviewing. The NAS explained the need for "[i]ncorporation of background additivity to account for . . . [a]dditional sources of exposure to the same chemical or to similarly acting chemicals (including endogenous sources). . . ."[104] As part of this analysis, EPA should aggregate or add the emissions for the most-exposed communities coming from: (1) the source category (including all individual sources within it); (2) facility-wide risk from collocated sources outside of this category; and (2) all other sources of toxic air pollution in the area.

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[98] *See, e.g.*, Cal. EPA, OEHHA, "Cumulative Impacts," *supra*.

[99] We support EPA's recognition of the need to assess whether the maximum exposed individual is exposed to emissions from more than one source *within* each source category, as it does using the AERMOD modeling tool. We also appreciate that EPA has considered facility-wide risk in some rulemakings. However, those assessments offer only part of the picture. And, even on both of these issues, EPA has provided very little information about what it included in such assessments. EPA often just states numbers found for facility-wide risk, without explaining where those numbers came from, how they were calculated, or what emission sources they cover.

[100] NESHAP: Mineral Wool Production and Wool Fiberglass Manufacturing, 76 Fed. Reg. 72,770, 72,786 (Nov. 25, 2011).

[101] U.S. EPA, "Concepts, Methods and Data Sources," *supra*, at xxxii (defining a cumulative risk assessment as including "aggregate exposures by multiple pathways, media and routes over time, plus combined exposures to multiple contaminants from multiple sources").

[102] *See* examples cited, *supra* note 11.

[103] SAB May 2010 at ii, *supra* note 62, at 10.

[104] NAS 2009 at 180 (explaining that this may require the use of default factors).

Virtually all of the existing federal air toxics standards (under section 112(d)) require periodic testing and monitoring, and this is something EPA must ensure is included in all rules as it updates them. Using these data, EPA can aggregate the community's exposure and assess the full health threats faced by the affected community, including from the source under review.

EPA must also consider the research that has already occurred to assess health risk from toxic air pollution in urban communities nationwide.[105] EPA should also draw on the OEHHA cumulative assessment approach.[106] EPA should consult with OEHHA and investigate the scientific approach it is using to address cumulative impacts, and consider and apply a similar science-based approach in residual risk assessments.

Further, the NAS has recommended that EPA evaluate "background exposures and vulnerability factors," as well as use "epidemiologic and toxicologic evidence" in its risk assessments.[107] Rather than separating an environmental justice analysis and considerations of inequality from the risk assessment, considering these factors as part of the cumulative risk assessment – because of the increased vulnerability created (as also discussed in Part I.E above) – would be a more effective, meaningful, and scientific approach.

In assessing a source category's emission contributions in affected communities and considering whether these contributions cause the most-exposed people to experience an unacceptable level of public health risk when combined with the existing baseline from past emissions, other HAP emissions, and the community's health status, EPA can describe and manage uncertainties, as it does and other federal agencies do for many other analyses.[108] Uncertainties do not justify failing to assess and address the severe cumulative harm and risk to local communities from air toxics sources. Rather, there is no excuse for treating an unknown amount of additional risk as a missing default, to use the NAS term.

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[105] *See, e.g.*, Rachel Morello-Frosch & Bill M. Jesdale, Envtl. Health Perspectives, *Separate and Unequal: Residential Segregation and Estimated Cancer Risks Associated with Ambient Air Toxics in U.S. Metropolitan Areas*, 114(3) Envtl. Health Perspectives 386 (2006) (assessing toxic air pollution cancer risk for 309 metropolitan areas encompassing 45,710 tracts); "National Air Toxics Program: The Integrated Urban Strategy," 64 Fed. Reg. 38,706, 38,738 (July 19, 1999).

[106] *See, e.g.*, Cal. EPA, "Cumulative Impacts," *supra*.

[107] NAS 2009 at 221-23 (discussing Menzie et al. 2007 model); *id.* at 230 (discussing the role of epidemiology and surveillance data).

[108] *See, e.g.*, 42 U.S.C. §§ 7475(a)(3), 7503(a)(1) (requiring a localized, cumulative assessment of whether or not a new or modified source's additional emissions will cause an attainment area to deteriorate, or will make it difficult for a nonattainment area to make progress toward achieving the national ambient air quality standards); *New York v. EPA*, 443 F.3d 880, 883 n.1 (D.C. Cir. 2006) (citing *New York v. EPA*, 413 F.3d 3, 11-14 (D.C. Cir. 2005)); *see also* 40 C.F.R. § 1508.27(b)(7) (requiring a consideration of "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts"); *see also* 40 C.F.R. § 1508.7; *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 524 F.3d 917, 930 (9th Cir. 2008) (applying 16 U.S.C. § 1536(a)(2) to enforce the Endangered Species Act duty to ensure against jeopardy which includes the requirement to assess a newly proposed action in the context of all other impacts, and determine whether or not the specific action will "tip a species from a state of precarious survival into a state of likely extinction," or, where baseline conditions already jeopardize a species, whether it will "deepen[] the jeopardy by causing additional harm").

As a scientific and policy matter, where there is exposure to air toxic emissions beyond the individual source category, the level of total risk that is occurring, including the baseline health risk and the risk from other sources, is greater. Thus, the total risk that is unacceptable for the most-exposed person must in fact be lower for each source category that person is exposed to, because it combines with other risks to create a *total* risk from all regulated source categories which must be minimized. Looking at a source category's contribution of risk in isolation is equivalent to ignoring the facts and pretending other health risks are not occurring. EPA may not decide that it is okay for a person to be exposed at a higher level simply because they live in a community where they are exposed to multiple sources of air pollution. That is the opposite of what EPA is required to do – protect the people in local communities who are most exposed and most vulnerable to air pollution. It also conflicts with EPA's own commitment to consider and provide environmental justice to overburdened communities.

At minimum, until EPA develops a data-driven approach to comprehensively model cumulative risk or impacts from multiple sources, EPA must not treat multiple source exposure as a missing default, or ignored amount of health risk. EPA must incorporate an explicit default or uncertainty factor to adjust the degree to which each individual source category is contributing to the total risk experienced by the most-exposed individuals. For example, wherever there is evidence that the source category is contributing pollutants on top of a history of other exposures or is contributing pollutants in addition to other source categories, the "unacceptable" level of cancer, non-cancer chronic, and acute risk from the source category must be adjusted downward based on the number of other facilities contributing HAP exposure risks (such that no single source category could consume all of it, when the most-exposed person is exposed to many other source categories). For a source category in an area with up to 10 other HAP-emitting facilities, this default or uncertainty factor should equal at least 10, consistent with the common scientific use of this factor for other kinds of vulnerability.[109]

D. Account for Additional Risk and Uncertainty.

In addition to and related to many of the issues already discussed, EPA must stop treating various types of risk as zero when the science shows risk is present; simply because EPA has not yet developed a risk function for a pollutant, type of exposure, or type of risk, does not mean risk does not exist and can be ignored.[110] As the NAS explained, EPA should develop "explicitly stated defaults to take the place of implicit or missing defaults," and "[k]ey priorities should be development of default approaches to support risk estimation for chemicals lacking chemical-specific information to characterize individual susceptibility to cancer . . . and to develop a dose-response relationship."[111]

1. EPA must not treat risk as zero for a pollutant for which it has no reference value.

[109] For areas with more facilities, which cause an even greater level of health risk combined, the UF should be adjusted accordingly, *i.e.*, 11-20 facilities would result in an UF of 20, and more than 20 would result in an UF of 100, so the source category's contribution is no higher than 1/100 of the threshold.
[110] *See*, *e.g.*, NAS 2009 at 203-04, 207.
[111] *Id*. at 207.

As the NAS explained, it is a problem that "agents that have not been examined sufficiently in epidemiologic or toxicologic studies are insufficiently included in or even excluded from risk assessments" by EPA.[112] Many chemicals have no cancer slope factor, RfD, RfC.[113] It is not appropriate to treat such compounds "as though they pose no risk that should be subject to regulation."[114] The NAS has recommended that EPA develop "explicit defaults to use in place of missing defaults," including for its "untested-chemical assumption," *i.e.*, that a chemical with no reference value poses no risk.[115]

Where there is no reference value for a pollutant, EPA may not simply *ignore* health risks associated with these pollutants completely in its analysis by hiding behind uncertainty. Section 112 requires EPA to address and regulate all emitted HAPs. EPA states that "an understatement of risk for these pollutants at environmental exposure levels is *possible*," in its rulemakings due to the lack of reference values.[116] In fact, an understatement of risk for pollutants that are excluded from the analysis is *certain* because EPA has performed no quantitative assessment of health risk for those pollutants *at all*. The absence of a reference value means that EPA does not know by how much it is *underestimating* risk to human health, but it does know that its assessment is an underestimation.

In the absence of an available reference dose, EPA must, at minimum, add an uncertainty factor to account for the additional risk that a HAP likely causes, until such time as EPA does have a reference value to use. Using a protective uncertainty factor – developed based on the best available science – would allow EPA to satisfy its legal duty under section 112(f)(2) to prevent unacceptable health risk, and ensure an "ample margin of safety to protect public health."[117] The NAS has described an approach EPA can use to account for this risk, and explained that this approach "is based on the notion that for virtually all chemicals it is possible to say *something* about the uncertainty distribution regarding dose-response relationships."[118] For example, EPA can use information on chemical structure, available toxicologic tests and model or experimental data, and data on similar chemicals that have been well-studied.[119]

Section 112(f)(2) of the CAA creates a critical duty and opportunity for EPA to conduct a comprehensive and protective analysis of risk to public health and the environment. In view of this, it is a serious problem for EPA's analysis that some pollutants continue to have no reference values.[120] Over twenty years after the Clean Air Act was amended, sufficient studies for some pollutants have not been conducted to calculate reference doses, reference concentrations, or potency values. Moreover, the Integrated Risk Information System ("IRIS") review process has been bogged down for many pollutants as the Government Accountability Office recently

[112] *Id*. at 193.
[113] *Id*. at 203.
[114] *Id.* at 193.
[115] *Id.* at 203.
[116] EPA, "National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins; Pesticide Active Ingredient Prod.; and Polyether Polyols Prod., Proposed Rule," 77 Fed. Reg. 1268, 1282 (Jan. 9, 2012) (emphasis added).
[117] 42 U.S.C. § 7412(f)(2).
[118] NAS 2009 at 203 (emphasis added).
[119] *Id.* at 204.
[120] *See, e.g.*, 77 Fed. Reg. 1268, at 1282.

documented.[121] As the Center for Progressive Reform ("CPR") has recognized, EPA should prevent the delay in this process from undermining its residual risk analysis for source categories under review.[122]

For pollutants currently under IRIS assessment, EPA must use the best available scientific information from the IRIS review during current rulemakings.[123] At minimum, EPA must account for the lack of reference values or the lack of an up-to-date final IRIS assessment rather than just allowing important rulemakings to go by without any consideration of health risk due to such pollutants.[124]

2. EPA must account for the cumulative risk of upsets and malfunctions, instead of ignoring this risk.

As another example of the problem of ignoring health risk in its assessment, EPA generally ignores the higher emissions caused by malfunction or upset emissions, which can accumulate and combine to increase public health impacts and risk. "Upsets are a significant problem for many areas, including rural ones, but they are a particular problem for the predominantly lower income communities of color surrounding many refinery and chemical complexes."[125] Malfunction or upset events increase emissions and thereby pose increased

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[121] U.S. Gov't Accountability Office, GAO-12-42, Chemical Assessments: Challenges Remain with EPA's Integrated Risk Information System Program 17-18 (2011).

[122] *See* Rena Steinzor *et al*., *Setting Priorities for IRIS: 47 Chemicals that Should Move to the Head of the Risk-Assessment Line*, Ctr. For Progressive Reform (Dec. 2010), (http://www.progressivereform.org/articles/IRIS_Priorities_1010.pdf. CPR's analysis of IRIS offers a critical expose of these problems. *EPA's IRIS: A Database With Blind Spots*, Ctr. For Progressive Reform, http://www.progressivereform.org/iris.cfm (last visited June 27, 2013). *See also* Gov't Accountability Office, GAO-11-278, "High Risk Series: An Update" (2011); Gov't Accountability Office, GAO-09-774T, http://www.gao.gov/new.items/d11278.pdf; Gov't Accountability Office, "EPA Chemical Assessments: Process Reforms Offer the Potential to Address Key Problems," (2009); Gov't Accountability Office, GAO-08-743T, http://www.gao.gov/new.items/d09774t.pdf; Gov't Accountability Office, "Toxic Chemicals: EPA's New Assessment Process Will Increase Challenges EPA Faces in Evaluating and Regulating Chemicals" (2008); Gov't Accountability Office, GAO-08-440, 29, (2008), http://www.gao.gov/new.items/d08743t.pdf; Gov't Accountability Office, "Chemical Assessments: Low Productivity and New Interagency Review Process Limit the Usefulness and Credibility of EPA's Integrated Risk Information System" (2008), http://www.gao.gov/new.items/d08440.pdf.

[123] Integrated Risk Information System (IRIS); Announcement of 2012 Program, 77 Fed. Reg. 26,751 (May 7, 2012).

[124] *See, e.g.*, Draft Residual Risk Assessment for the Mineral Wool Production and Wool Fiberglass Manufacturing Source Categories at 23 tbl. 3.1-1; id. at 30 tbl. 4.1-1 (Sept. 2011), EPA-HQ-OAR-2010-1042-0086 (due to lack of reference value for hydrogen fluoride (HF), antimony, and other pollutants, EPA failed to account for any health risk from these pollutants). Similarly, there is no reference value for lead, and no safe level of lead exposure. Although information exists regarding how EPA could try to address this (such as using California's benchmark for action of avoiding a blood-lead level increase of 1.0 ug/dL), EPA regularly assesses only whether a source, alone, will cause an exceedance of the 2008 Lead National Ambient Air Quality Standards, instead of evaluating how to prevent harm from the lead emissions of a a source category, in combination with other pollutants and other sources. *See, e.g., id.* at 11; "Secondary Lead Smelting Residual Risk Assessment" at 12 (Dec. 2011), EPA-HQ-OAR-2011-0344-0160.

[125] Envtl. Integrity Project, Gaming the System: How Off-the-Books Industrial Upset Emissions Cheat the Public Out of Clean Air at 1-2 (Aug. 2004) (finding significant likelihood of an upset at refineries, chemical plants, gas plants and a carbon black plant, and finding that the resulting emissions release is many times higher than the amount of otherwise-reported annual emissions), http://www.environmentalintegrity.org/news_reports/Report_Gaming_System.php.

health risks which EPA must consider. Where control equipment fails, emissions could be at least 100 times greater (*e.g.*, in the circumstance where a control device has 99% efficiency, such that an uncontrolled release would cause 100 times the usual amount of emissions).

Failing to look at the true potential for spikes in emissions over a person's lifetime may underestimate acute risk, cancer risk and the amount of chronic risk based on pollutants that persist in the environment, such as PCBs, POM, lead, and cadmium. Ignoring these emission spikes is equivalent to treating additional health risk caused by exceedances as zero. EPA knows that there is additional risk from malfunctions and violations, and that this additional risk should not be ignored in risk assessments.

To assess the health risk from malfunctions, EPA has information available or can collect information on major sources' malfunction and violation histories.[126] Moreover, EPA regularly uses statistical methods and probability factors, which are readily available tools that EPA can also use to assess health risk due to malfunctions, to set clean air standards. Further, to calculate acute health risk, EPA uses what it calls a "worst case" scenario approach that attempts to account for some variability under the existing standard, which (although this does not fully do so) shows that the agency could similarly add a factor to account for malfunctions for acute and other types of health risk.

III. ACCOUNT FOR CUMULATIVE IMPACTS OF MULTIPLE EXPOSURES AND VULNERABILITIES BY SHIFTING THE LEVEL OF RISK WHICH TRIGGERS POLICY ACTION.

EPA has a longstanding policy of assuming that it is possible to find a safe or acceptable level of cancer and other kinds of health risks. Currently available science debunks this assumption because there is so much uncertainty built into EPA's risk assessments, and because EPA lacks information on so many pollutants. For communities overburdened by pollution, this policy is especially problematic.

As a major example, EPA should recognize that cancer risk from a major industrial source category of toxic air pollution (listed under CAA § 112) that is 100-in-1 million or less cannot be presumed safe or "acceptable." Since 1990, however, EPA has made this assumption. EPA based this assumption not on scientific information about cancer risk, but on an unusual study of people's perceptions of their own risk from 1988, known as the Survey of Societal Risk (July 1988), to consider various types of health risks at that time.[127] Using a comparison of cancer risk to other kinds of hazards Americans then faced in their daily lives, EPA effectively

[126] *See, e.g.*, EPA, Enforcement and Compliance History Online (ECHO), www.epa.gov/echo; Kelly Haragan, Envtl. Integrity Project, "Gaming the System: How Off-the-Books Industrial Upset Emissions Cheat the Public Out of Clean Air" (Aug. 2004), 1-2, 5, http://www.environmentalintegrity.org/news_reports/Report_Gaming_System.php (finding significant likelihood of an upset at refineries, chemical plants, gas plants and a carbon black plant, and finding that the resulting emissions release is many times higher than the amount of otherwise-reported annual emissions and that "releases from upsets actually dwarf a facility's routine emissions.").

[127] Benzene Rule Docket No. OAQPS 79-3, Part I, Docket Item X-B-1, EPA Air Docket (cited at Nat'l Emission Standards for Hazardous Air Pollutants; Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants, 53 Fed. Reg. 28,496, at 28,512-13 (July 28, 1988)).

chose a number out of a hat that it would consider acceptable. EPA looked at an odd collection of risks, such as dangers from driving a car, and found that "the presumptive level established for MIR [maximum individual risk of cancer] of approximately 1 in 10 thousand is within the range for individual risk in the survey, and provides health protection at a level lower than many other risks common 'in the world in which we live.'"[128]

EPA has failed to revisit or update this number for the decades since, even though scientists have made breakthroughs on early-life exposure and children's vulnerability; biomonitoring and other data on adult body burdens of chemicals; the vulnerability of overburdened communities, including socioeconomic disparities; and on ways to analyze and control the impacts of pollutants on human health.

LANDMARKS SINCE 1990

1990 Clean Air Act Amendments required technology-based control for hazardous air pollutants and 8-year review of residual health risk to ensure protection of communities.

1993 National Research Council published *Pesticides in the Diets of Infants and Children*, finding that children are not little adults, and have greater exposures and susceptibility.

1994 President Clinton signed Executive Order 12898 on Environmental Justice.

1996 Food Quality Protection Act passed unanimously with a 10-Fold Children's Safety Factor.

Safe Drinking Water Act amendments required attention to susceptibility of children.

EPA announced a new National Agenda to Protect Children's Health.

1997 President Clinton signed the Children's Environmental Health Executive Order 13045.

2000 EPA first published *America's Children and the Environment.*

2009 National Academy of Science published *Science and Decisions: Advancing Risk Assessment*.

2009 Then-EPA Administrator Jackson declared environmental justice and children's health priorities.

2011 EPA announced Plan EJ 2014 including rulemaking and science goals.

[128] 54 Fed. Reg. 38,044, 38,046 (Sept. 14, 1989) (emphasis added) (quotation omitted).

It is time for EPA scientists and science policymakers to revisit the outdated assumption EPA makes regarding what level of cancer risk triggers policy interventions. EPA's own policy regarding carcinogens recognizes that they have no safe threshold of exposure. EPA has appropriately recognized that cancer risks add up to increase lifetime risk. EPA cannot reconcile what it knows – and does not know – about carcinogens with its outdated presumption that a cancer risk of 100-in-1 million is acceptable.

Importantly, EPA's presumption regarding cancer risk ignores the experience of communities exposed to multiple sources and types of sources of pollution. Even if some level of risk might otherwise be acceptable, that cannot be assumed to be true for communities exposed to more than one source that is causing that level of health risk. EPA has a responsibility to address the science on cumulative impacts and risk and update its assumptions accordingly, to acknowledge that cancer risks below 100-in-1 million cannot be presumed safe.

EPA should also reform how it evaluates chronic and acute hazard indices, in which a risk number below 1 does not result in policy changes or standards. EPA should instead factor in uncertainties and vulnerability factors that adjust the "acceptable level of risk." This is currently done under FQPA when EPA uses factors to determine a Target Margin of Exposure and risks below this level warrant increased scrutiny and changes to allowable exposures.[129]

In the face of increasing evidence which challenges the assumption of a safe or acceptable level of exposure, EPA should also consider reforming risk assessments to support reducing risks to the lowest possible level, to protect public health, rather than suggesting that there is a safe or acceptable level.

[129] *See, e.g.*, EPA, Sulfuryl Fluoride; Proposed Order Granting Objections to Tolerances and Denying Request for a Stay, Proposed Rule, 76 Fed. Reg. 3422, 3427 (Jan. 19, 2011) (explaining use of MOE).

APPENDIX B: KEY SOURCES

In general, for further information on each of the topics discussed here, the agency should consult the following sources:

1. George Alexeef *et al.*, *A Screening Method for Assessing Cumulative Impacts*, 9 Int'l Journal of Envtl. Research and Pub. Health 648-659 (2012); doi:10.3390/ijerph9020648.

2. Ramya Chari *et al*., Integrating Susceptibility into Environmental Policy: An Analysis of the National Ambient Air Quality Standard for Lead, 9 Int'l Journal of Envtl. Research Pub. Health1077-1096 (2012).

3. Peter L. deFur *et al.*, Vulnerability as a Function of Individual and Group Resources in Cumulative Risk Assessment, 115(5) Envtl. Health Perspectives, 817-24 (2007).

4. Kelly Haragan, "Gaming the System: How Off-the-Books Industrial Upset Emissions Cheat the Public Out of Clean Air," Envtl. Integrity Project (Aug. 2004), http://www.environmentalintegrity.org/news_reports/Report_Gaming_System.php.

5. Sarah Janssen *et al*., Strengthening Toxic Chemical Risk Assessments to Protect Human Health, NRDC, Sci. & Envtl. Health Network, Issue Paper (Feb. 2012).

6. Kristen Lombardi, "'Upset' emissions: Flares in the air, worry on the ground," The Ctr. for Pub. Integrity, http://www.publicintegrity.org/2013/05/21/12654/upset-emissions-flares-air-worry-ground.

7. Paul Mohai, Byoung-Suk Kweon, Sangyun Lee & Kerry Ard, *Air Pollution Around Schools Is Linked to Poorer Student Health And Academic Performance*, 30(5) Health Affairs 852 (published online May 4, 2011; 10.1377/hlthaff.2011.0077).

8. Rachel Morello-Frosch *et al.*,, Understanding *the* Cumulative Impacts of Inequalities In Environmental Health: Implications for Policy, 30(5) Health Affairs (2011).

9. Rachel Morello-Frosch & Bill M. Jesdale, Separate and Unequal: Residential Segregation and Estimated Cancer Risks Associated with Ambient Air Toxics in U.S. Metropolitan Areas, 114(3) Envtl. Health Perspectives 386 (2006).

10. Nat'l Research Council, Nat'l Acad. of Sciences, *Science and Decisions: Advancing Risk Assessment* (2009).http://www.nap.edu/catalog.php?record_id=12209.

11. Nat'l Acad. of Sciences, *Phthalates and Cumulative Risk Assessment: The Tasks Ahead* (2008).

12. Office of Envt'l Health Hazard Assessment, "Air Toxics Hot Spots Risk Assessment Guidelines*:* Technical Support Document for Exposure Assessment and Stochastic Analysis, Scientific Review Panel Draft," Cal. EPA (June 20, 2012), http://oehha.ca.gov/air/hot_spots/SRP/index.html.

13. Office of Envt'l Health Hazard Assessment, California Communities Environmental Health Screening Tool (CalEnviroScreen 1.0*)*, Cal. EPA (April 2013), http://oehha.ca.gov/ej/ces042313.html.

14. Office of Envt'l Health Hazard Assessment, Technical Support Document for Cancer Potency Factors: Methodologies for Derivation, Listing of Available Values, and Adjustments to Allow for Early Life Stage Exposures, Cal. EPA (May 2009), http://oehha.ca.gov/air/hot_spots/tsd052909.html.

15. Office of Envt'l Health Hazard Assessment, Appendix J: "In Utero and Early Life Susceptibility to Carcinogens: The Derivation of Age-at-Exposure Sensitivity Measures," Cal. EPA (May 2009), http://oehha.ca.gov/air/hot_spots/tsd052909.html,http://oehha.ca.gov/air/hot_spots/2009/AppendixJEarly.pdf.

16. Office of Envt'l Health Hazard Assessment, "Cumulative Impacts: Building a Scientific Foundation," Cal. EPA (Dec. 31, 2010), http://oehha.ca.gov/ej/pdf/CIReport123110.pdf.

17. Office of Envt'l Health Hazard Assessment, Child-specific Health Reference Doses, Cal. EPA (June 22, 2009), http://oehha.ca.gov/public_info/public/kids/chrdtable.html

18. Dawn Reeves, Sierra Club Calls For EPA To Address Cumulative Impacts Under NEPA, Inside EPA, Vol. 33, No. 5 (Aug. 31, 2012).

19. James L. Sadd *et al*., Playing It Safe: Assessing Cumulative Impact and Social Vulnerability through an Environmental Justice Screening Method in the South Coast Air Basin, California, 8 Int'l Journal of Envtl. Research and Pub. Health 1441-1459 (2011).

20. Elizabeth Shogren & Robert Bennincasa, "Baton Rouge's Corroded, Overpolluting Neighbor: Exxon Mobil," Nat'l Pub. Radio, (May 30, 2013, 4:29 PM), http://www.npr.org/2013/05/30/187044721/baton-rouge-s-corroded-overpolluting-neighbor-exxon.

21. Letter from Pamela Shubat, Chair, Children's Health Protection Advisory Committee, to Lisa Jackson, Administrator, EPA (Oct. 21, 2010), http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CHPAC_NRC_Report.htm.

22. Sierra Club, "The State of Detroit's Environment: An Initial Assessment Using the Framework of Environmental Justice (2013).

23. Letter from Sierra Club North Star Chapter to William Lynott, Minnesota Pollution Control Agency, (on file with author).

24. Jason Su *et al.*, *An Index for Assessing Demographic Inequalities in Cumulative Environmental Hazards with Application to Los Angeles, California*, 43(20) Envtl. Sci. Tech. 7626–7634 (2009)).

25. U.S. EPA, “Report of the Task Group of the Children’s Health Protection Advisory Comm. on America’s Children & the Env’t,” 3d Ed. (2010)

26. U.S. EPA, Sci. Advisory Bd., Review of EPA’s draft entitled, “Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA’s Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing,” EPA-SAB-10-007 (May 2010).

For additional reference, commenters have also attached a bibliography on cumulative impacts and a bibliography on environmental justice, prepared by the Coalition For A Safe Environment, for EPA’s review and consideration.

APPENDIX C: SCIENTIFIC AND POLICY DEVELOPMENTS

Summary of Major Developments Relevant to
Children's Health Risk and Environmental Justice

In recent decades, many major scientific and policy developments have occurred, all directing that the federal government – and, in particular, EPA – must fully account for health risk to children due to early-in-life exposure, and for the need to consider and provide environmental justice. Science now shows that "[e]nvironmental contaminants can affect children quite differently than adults, both because children may be more highly exposed to contaminants and because they may be more vulnerable to the toxic effects of contaminants."[130]

In 1993, the National Research Council published *Pesticides in the Diets of Infants and Children*, finding that children are not little adults, and have greater exposures and susceptibility.[131]

In 1994, President Clinton signed Executive Order 12898 on Environmental Justice.[132]

In 1996, Congress enacted the Food Quality Protection Act and the Safe Drinking Water Act amendments, which explicitly require consideration of the susceptibility of children and due to early exposure.[133] This same year, EPA announced a new National Agenda to Protect Children's Health.

In 1997 the President issued the Children's Environmental Health Executive Order (No. 13045) on the need to address risks to children.[134]

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[130] U.S. EPA, "America's Children & the Env't," 3d Ed. at 8 (2013).

[131] Nat'l Research Council, "Pesticides in the Diets of Infants and Children" (1993); *see also* Hugh A. Barton *et al.*, *Assessing Susceptibility from Early-Life Exposure to Carcinogens*, 113(9) Envtl. Health Perspectives 1125 (2005); Dale Hattis *et al.*, *Age-Related Differences in Susceptibility to Carcinogenesis: a Quantitative Analysis of Empirical Animal Bioassay Data*, 112(11) Envtl. Health Perspectives 1152 (2004).

[132] Exec. Order No. 12898, 3 C.F.R. 859 (1995), *reprinted as amended in* 42 U.S.C. § 4321 (1998).

[133] 21 U.S.C. § 346a(b)(2)(C) (requiring that, in taking certain actions on pesticides "an additional tenfold margin of safety for the pesticide chemical residue and other sources of exposure *shall be applied for infants and children to take into account potential pre- and post-natal toxicity and completeness of the data with respect to exposure and toxicity to infants and children*") (emphasis added); 42 U.S.C. § 300g-1(b)(1)(C) (requiring that, in selecting unregulated contaminants for consideration, EPA "shall take into consideration, among other factors of public health concern, the effect of such contaminants upon subgroups that comprise a meaningful portion of the general population (such as *infants, children, pregnant women*, the elderly, individuals with a history of serious illness, or other subpopulations) that are identifiable as being at greater risk of adverse health effects due to exposure to contaminants in drinking water than the general population") (emphasis added); *id.* § 300j-18(a)(1) (requiring EPA to "identify groups within the general population that may be at greater risk than the general population of adverse health effects from exposure to contaminants in drinking water. The study shall examine whether and to what degree *infants, children, pregnant women*, the elderly, individuals with a history of serious illness, or other subpopulations that can be identified and characterized are likely to experience elevated health risks, including risks of cancer, from contaminants in drinking water. . . .") (emphasis added).

[134] Exec. Order 13045, 62 Fed. Reg. 19,885 (Apr. 21, 1997).

In 2000, EPA first published *America's Children and the Environment*, which it has since updated.[135]

In 2006, EPA issued new guidance on protecting children from environmental health risks as part of the rulemaking process.[136] Among other things, this Guide, at 8, recognized the problem of disproportionate risk to children because they may be more sensitive to pollution and exposed at a higher rate than adults because of their developmental stage. This Guide also recognized the need "to think in terms of the broad range of early life, pre-natal and post-natal, environmental exposures that may affect the incidence of disease or alter development."[137]

In 2008, EPA updated the Child-Specific Exposure Factors Handbook.[138]

In 2008 and 2009, the major National Academy of Sciences reports – *Science and Decisions: Advancing Risk Assessment* ("NAS 2009"), and *Phthalates and Cumulative Risk Assessment: The Tasks Ahead* (2008) – were released, re-emphasizing the importance of addressing real-world risk to children and cumulative health risk.

In 2009, EPA Administrator Jackson declared environmental justice and children's health priorities.

In 2010, EPA Administrator Jackson issued *EPA's Action Development Process: Interim Guidance on Considering Environmental Justice During the Development of an Action.*[139]

In 2011, EPA Administrator Jackson announced Plan EJ 2014 including rulemaking and science goals to finally achieve the goals of the 1994 Environmental Justice Executive Order.[140] EPA continues to work to issue guidance that will advance these goals.

In addition, in recent years, EPA's Children's Health Protection Advisory Committee has recommended addressing the developmental origins of adult disease that come from childhood exposure to air pollution and other environmental contaminants.[141] Similarly, the Committee has

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[135] U.S. EPA, "American's Children and the Env't" (3d ed. 2013), http://www.epa.gov/opeedweb/children/publications/index.html.

[136] U.S. EPA, "Guide to Considering Children's Health When Developing EPA Actions: Implementing Executive Order 13045 and EPA's Policy on Evaluating Health Risks to Children" (2006), http://yosemite.epa.gov/ochp/ochpweb.nsf/content/ADPguide.htm/$File/EPA_ADP_Guide_508.pdf.

[137] *Id.*

[138] U.S. EPA, Child-Specific Exposure Factors Handbook (2008).

[139] U.S. EPA, "EPA's Action Development Process: Interim Guidance on Considering Environmental Justice During the Development of an Action" (2010). http://www.epa.gov/compliance/ej/resources/policy/ej-rulemaking.html.

[140] Plan EJ 2014, U.S. EPA, http://www.epa.gov/compliance/ej/plan-ej/index.html.

[141] U.S. EPA, *Report of the Task Group of the Children's Health Protection Advisory Comm. on America's Children & the Env't*, 3d Ed. (2010).), http://yosemite.epa.gov/ochp/ochpweb.nsf/content/ACETask.htm/$file/ACE%20Task%20Group%20Report.pdf.

recommended that EPA incorporate a more robust analysis of childhood and pre-natal exposure to environmental contaminants into its risk assessment method.[142]

The Science Advisory Board (SAB) has also urged EPA to address the greater risk to children from hazardous air pollution.[143] As the SAB further explained: "California's Office of Environmental Health Hazard Assessment (OEHHA) has very recently updated its methodology in ways that could affect the development of RfC and URE (unit risk estimate) values. EPA should examine these developments to make sure that the RTR process adequately covers children's risks."[144]

Finally, during the last decade, OEHHA has also released a number of groundbreaking scientific determinations and protocols to consider and address children's health, early life exposure, and cumulative impacts, which are cited in this document, above, and are all available at http://oehha.ca.gov/.

[142] Letter from Pamela Shubat, Chair, Children's Health Protection Advocacy Council,CHPAC to Lisa Jackson, Administrator, U.S. EPA, (Oct. 21, 2010) ("CHPAC recommends that EPA staff scientists participating in the upcoming discussions bring the concern of early life stage exposure and sensitivity to the conversations that will take place concerning optimizing risk assessment practice."), http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CHPAC_NRC_Report.htm.

[143] U.S. EPA, Sci. Advisory Bd., Review of EPA's draft entitled, "Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing, EPA-SAB-10-007 (May 2010), at 7 (stating that "an overarching concern with the Agency's chronic inhalation exposure estimates is that children's exposures do not appear to have been adequately addressed"); *see also id.* at 34 n.13 ("In particular is the question of whether the interindividual variability factor for non-carcinogens and the standard cancer unit risk derivation adequately covers children. If it does not, it is a potentially significant uncertainty given the greater intake rate of children via inhalation and sensitivity to carcinogens and other toxicants.").

[144] *Id.*

APPENDIX D: CHILD-SPECIFIC NON-CANCER CHART

Non-Cancer Health Risk:
Comparison of Cal. EPA OEHHA Child-specific health reference values to U.S. EPA reference values

Chemical	OEHHA Child-health Reference Dose (chRD) or value*	U.S. EPA Chronic Oral Reference Dose (RfD)	Difference Between OEHHA and U.S. EPA	Order of Magnitude Difference between OEHHA and U.S. EPA
Atrazine	0.006	0.035	6	1
Cadmium	0.000011	0.0005 (water)	45	1
		0.001(food)	91	2
Chlordane	0.000033	0.0005	15	1
Chlorpyrifos	0.0001	0.0003	3	-
Deltamethrin	0.0001	0.01	100	2
Heptachlor	0.00003	0.0005	17	1
Heptachlor epoxide	0.000013	0.000013	1	-
Manganese	0.03	0.14	5	1
Methoxychlor	0.00002	0.005	250	2
Nickel	0.011	0.02	2	-
Pentachlorophenol	0.001	0.005	5	-
Lead	OEHHA action level*	*EPA has not updated its action levels; CDC has reduced (2012).*		
	1 (as a blood-level increase)	10 (5 - as a total)	10 (5 - as a total)	1

* All units are in mg/kg-day except lead which is in µg/dL blood. The lead value is not a dose. For lead this is a health benchmark indicating the increase in a child's blood lead concentration showing protective action is needed.

Source: Office of Environmental Health Hazard Assessment (OEHHA), Cal. EPA
(Table of all child-specific reference doses finalized as of 06/22/09, http://oehha.ca.gov/public_info/public/kids/chrdtable.html)

Appendix E:
STORIES FROM COMMUNITIES OVERBURDENED BY POLLUTION

Cynthia Babich, Del Amo Action Committee, Torrance , CA (Los Angeles County):

I've been working in my community for 23 years. For us, it's easy to see that we have multiple impacts, but the EPA has yet to take action.

I work in an old industrial WWII complex in a part of unincorporated Los Angeles County. Most of the people in the community are Latino and comprised of multigenerational immigrants. We are surrounded on three sides by industry: Dow Chemical Plastics and Exxon Mobil are on a list of top 10 emitters in the country. There are two Superfund sites—some of the more toxic sites in the country. One of the sites is Montrose Chemical Corporation of California,[145] at one time the largest manufacturer of DDT in the county. Montrose disposed of its manufacturing waste in a drainage ditch that ran alongside the plant property. DDT contaminated the entire community, because they used to grind it outside, and the wind blew it right into the community. Most of it settled into people's attics 50, 60 years ago, and it continues to poison them to this day. Next door to Montrose is the other Superfund site, Del Amo, which was a synthetic rubber plant during WWII. When they were making tires for the war planes, they would take the waste product and dump it into unlined pits, contaminating the soil and groundwater. The vapors from the soil escape into buildings and homes today.

We also have three groundwater plumes that are all being looked at separately because they are from different facilities. We have the plumes coming from the two Superfund sites, and a huge one from Exxon Mobil refinery and another one from Jones Chemical, a chlorine transfer station. If there was a hole, someone filled it—whether it was DDT, construction debris, or metal slag. Not to mention, this community is adjacent to two freeways. We've been calling for these toxic sources to be looked at combined for years.

When I moved into my neighborhood, I looked for everything except toxic waste sites. Soon after moving, I started getting fistulas, and I had heart problems and trouble breathing, and it took so long for the doctors to figure out what was wrong. At one point, my husband I thought I was going to die. We didn't know that the house we had moved into abutted a waste pit site and technical grade DDT was buried in our backyard. All the time I was thinking, "People get sick—it's the law of averages." When I was home healing from one of my surgeries, I found out about the Superfund sites. And then I got upset. This wasn't the law of averages, I was being poisoned. People knew about this and did nothing. Not long after this discovery, doctors found a dermoid cyst on my ovary and I had to get it removed. Now, I am unable to have children. When I go into the neighborhood to work, my face breaks out—I always get rashes. My husband operates his machinery repair business, and now gets violently ill. It's difficult for me to watch someone to get sick like that, especially my husband.

Most people in this community are very concerned about our health. Our group has done our own studies by going door-to-door, and found that individuals in 1 in 4 homes have severe asthma problems. The community has higher than state average rates of asthma and respiratory issues. The symptoms that most people reported were bloody noses, rashes, vomiting, miscarriages, and joint pains. Twin boys were born in 1994 to a family born near the Montrose Superfund site. One was born with hypospadias, the other twin has developmental problems. One family had an infant die, and not long after, another was born without a brain stem.

[145] http://industriallosangeles.org/sites/montrose.html

Until the EPA measures the cumulative impacts of pollution, my community will suffer. People aren't asking for much—they just want to be able to live in our community, breathe air, put a glass under the tap and not want to think about whether it's contaminated or not.

It is upsetting that no one is looking at the cumulative impacts when all of this is happening and has happened to us.

Northern Delaware
Amy Roe, Conservation Chair, Sierra Club, Delaware Chapter

In northern Delaware, where I live, the air is unsafe to breathe. Ozone action days are commonplace and toxic releases from the numerous chemical plants and the nearby oil refinery occur regularly. The groundwater in eastern New Castle County has been contaminated, and just this month a drinking water well near the town of New Castle was closed because of 1,4-dioxane from a nearby Superfund site. The fish in our rivers and streams are unsafe to eat and most of the water bodies in New Castle County have a "no consumption" advisory. We are forced to endure the legacy pollution from past manufacturing and hazardous waste disposal, while new pollutants are added to our environment from existing facilities. This month I learned that my city has been negotiating to build a 248 MW power plant at the edge of my neighborhood, just a few blocks away, and a stone's throw from the playground where I played on the swings as a child. Past and present threats to public health are being added to with plans for future development. It's hard to keep up with the extent of the risk in the heart of America's chemical industry.

The regulatory oversight of air and water pollution needs dramatic improvement. The response that I have received from state regulators for air pollution concerns that made me ill and nauseated during the restart of the Delaware City Refinery was that the "air" I am breathing is just "air." The air that I am breathing is not just air! It is filled with fine particles and toxic vapors from many industrial facilities including, but not limited to, the refinery, Formosa Plastics, FMC Biopolymer, AI Dupont Sulfuric Acid Regeneration Plant, Kuehne Chemical Company, DuPont Edgemoor and the DuPont Experimental Station.

The EPA has the ability to update its approach to use the best available scientific information for cumulative risk, including under the Clean Air Act. It is the cumulative risk from multiple sources of exposure that concerns me most. Each plant and factory has mastered the art of blaming the others nearby for foul smells and pollution. Because we are surrounded by so many factories and chemical plants, no one takes responsibility for air pollution, water pollution, or the contamination of our fish. The cumulative risk of exposure is not used to cap pollution in our area, and new projects seem to pop up all the time. State regulators have bought into this passing of the blame, by allowing permits for increasing amounts of pollution because, as individual sources, they are seen as small amounts that are insignificant to the whole. Our regulators do not have to take a holistic approach, so they do not.

Science-based standards for cumulative risk assessment would result in the dramatic improvement of our lives and health. It would dramatically improve the way that pollution standards are assessed to consider the health impacts to our communities as part of the regulatory process. We can take steps to eat right, to exercise, and to be as healthy as possible, but we cannot take individual steps to shield ourselves from the polluted landscape that surrounds us. We need your help to improve our lives. Please assess the full impact of pollution on our communities and increase our protection.

Midlothian, Texas

As the self-proclaimed cement capitol of Texas, Midlothian is home to three major cement manufacturing facilities. Texas Industries (TXI), Holcom, and Ash Grove contaminate the air with a combined yearly total of 57 million pounds of mercury, nitrogen oxides, sulfur dioxide, and other dangerous chemicals. Gerdau Ameristeel, a large steel plant, is adjacent to TXI's cement plant. Some of the fuel sources used by these plants were approved without an opportunity for public comment or requirements for testing emissions and cumulative impacts.

The cumulative effects of the aforementioned sources are of great concern to community residents who are exposed to the resulting combined air contaminants.

After moving to Midlothian, Texas in July 2001, "my three children and I got sick," says former resident Alex Allred:

> "Within a few months of our move, my two-year old son was constantly in and out of the hospital—first, with bronchitis, then pneumonia, then double bronchitis. It was not until I began speaking to school nurses, other parents, and at last, a physician at Children's Medical Center in Dallas that we understood. The air in Midlothian was literally harming our child. My son's elementary school would go on to be named in the upper 1% of most toxic elementary schools in the nation. After 12 years of one health crisis after the next, we relocated to Waxahachie, Texas, only 20 miles south of Midlothian. Within a week of moving, I noticed dramatic changes to Tommy's health, and within two months of moving, my son was off half of his medicines. I would say it's a miracle but it is not. It is a sad reality of where we were living, and now, we can all breathe easier—no pun intended. Not only are we saving Tommy's life by moving away from the cement plants but we are saving money as well—I spent roughly $10,000 on medical expenses while living in Midlothian. Cement plants often talk about the economics of 'business as usual,' forgetting the cost of human life and suffering."

Scientific data support residents' concerns. The Agency for Toxic Substances and Disease Registry (ATSDR), which has been evaluating health risks in Midlothian, stated in its recent report entitled "Assessing the Public Health Implications of the Criteria (NAAQS) Air Pollutants and Hydrogen Sulfide" that "...sufficient information exists to warrant concern for multiple air pollutant exposures to sensitive individuals …." In its study, ATSDR found that ozone exposure in recent years has reached harmful levels for active children and adults, and people with asthma. Additionally, ATSDR emphasized a need for more scientific research in order to fully understand the cumulative impacts of multiple pollutants.

Assessing cumulative impacts is also important to individuals downwind of the Midlothian plants.

Dallas-Fort Worth area resident Becky Bornhorst is a volunteer for Downwinders at Risk:

> "My family enjoys outdoor activities such as sailing, canoeing, and swimming in Texas lakes and rivers, but such recreation is already curtailed by the fact that Texas has fish advisories or bans on 22 bodies of water." (Joe Poole Lake, where her family enjoys recreation activities was recently found to have a mercury level of .5ppm, just under the Texas Department of Health warning level of .7ppm.) "Mercury poisoning is a threat to me and my family when we are at the lake, the supermarket, or just breathing when the wind is blowing from the wrong direction," says Bornhorst. "We cannot escape it."

Houston Ship Channel, Houston, TX:

Since 1988, Air Alliance Houston has worked to reduce air pollution in the Houston region and protect public health and environmental integrity through research, education, and advocacy. Air Alliance is the Houston region's leading environmental health and air quality nonprofit. Air Alliance's vision is clean air so our economy, quality of life, and children can thrive.

A significant amount of the organization's work has focused on environmental justice issues in communities along the Houston Ship Channel. The Ship Channel hosts one of the largest concentrations of petrochemical facilities in the world, which in addition to the area's refineries, other industrial facilities, and high traffic of shipping barges and diesel trucks, leads to poor regional air quality and complex health and environmental challenges.

As Adrian Shelley, Executive Director of Air Alliance Houston, explains, "The communities of the Ship Channel disproportionately suffer the impacts and are not enjoying the opportunities of these chemical facilities."

The negative health impacts on these communities, which include overwhelmingly low income communities of color, are undeniable. A study of nearly 300 residents by Air Alliance in partnership with the Healthy Port Communities Coalition conducted between March and April 2013 found that communities near the Port of Houston experience higher than average rates of allergies, cancer, and respiratory illnesses. In comparison to state statistical averages, residents near the Port of Houston reported rates of asthma twice as high in adults and children, and reported rates of cancer ten times as high. Eighty-six percent of respondents expressed concern about pollution from local refineries in the survey, and 89% of respondents expressed concern about the effects of pollution on their health. Problematically, 54% of respondents did not have health insurance and nearly half of residents have an unemployed household member. The combination of high pollution exposure and lower access to health care in this community shows the need for EPA to look at and reduce the cumulative impacts these environmental justice communities face.

Port Arthur, Texas

Port Arthur, a small town with just under 60,000 residents located 90 miles south of Houston on the Gulf Coast of Texas, hosts a large number of industrial sources that release some of the harshest toxic contaminants for public health. Heavy metals and toxic chemicals are released into the air by the Valero Port Arthur Refinery, Huntsman Petrochemical, and the Chevron, as well Flint Hills Resources LLC. Nearby in East Port Arthur, Total Petrochemicals USA, Premcor Refining, and BASF Fina Petrochemicals. Motiva Enterprises, owned jointly by Shell Oil Products and Saudi Refining, Inc. and located in Port Arthur, is the largest oil refinery in the United States.

Right across the fence-line from Motiva Enterprises, are the residents of Carver Terrace, a local community on the West Side of Port Arthur. Largely African-American and low income, the approximately 200 families of this community have long experienced the symptoms of the airborne toxic chemicals, marked by marginally higher incidences of asthma, reparatory illnesses, and cancer than state statistical averages.

"People are breathing benzene out here," says Hilton Kelley. "That's a known carcinogen. They're breathing sulfur dioxide, a toxin that messes with your respiratory system—people call that the rotten-egg smell. Clean, breathable air is a basic human right the folks out here have been deprived of."

Hilton Kelley is the Founder and CEO of Community In-Power & Development Association, Inc. (CIDA). Kelley spent most of his childhood and currently lives in the town of Port Arthur.

Describing an example experience, "The odors from the refineries were pungent," Kelley recalled in an interview with Oprah Magazine in 2011.[146] "There was a large number of people sick with cancer and respiratory problems. Kids were just running, unsupervised, in the streets. It seemed all anybody could do was pray."

This disparate impact of negative health effects related to industrial pollution is partly a function of inequality. Refineries have expanded their profits and kept the price of gas low in part by refusing to invest in pollution control equipment at the expense of the health of local communities.

To bring awareness to these inequalities, Kelley and CIDA began to challenge the regulatory agencies, and the policies and environmental violations of the plants that loom over the community. Over the last decade, Kelley has helped set Port Arthur's West Side neighborhood on a healthier, more sustainable path. It has been a long road – and still is, for those living next door to some of the petrochemical facilities and refineries that supply other parts of the United States, but Kelley pushes on. "These are my people," said Kelley. "They were my teachers, my coaches. They go to my church. These could be my own kids. I really need to be here."

A serious problem Kelly and CIDA have long faced is the fact that it is so difficult to get anyone to look at the whole impact of all of the polluting sources in Port Arthur, TX. Although EPA recently named Port Arthur an "Environmental Justice Showcase Community,"[147] local residents are still waiting for meaningful, lasting relief from petrochemical flaring and other kinds of pollution that combine each day in their local air and environment.

Louisiana Bucket Brigade, Anna Hyrbyk

We work with communities that live on fence-lines of oil and gas industry throughout the state. Our mission is to use grassroots action to create informed, sustainable communities that are free from industrial pollution. The "Bucket" is an EPA-approved bucket kit that tests for organic compounds. This is similar to something EPA regulators normally use. We train communities to use the buckets, and we send off the air samples into labs.

Right now we are active in two communities that are surrounding refineries: Exxon Mobil refinery in Baton Rouge and Calumet Lubricants refinery in Shreveport. Both of those communities are large urban areas. Shreveport has 56,000 people living within two miles of the plant. Baton Rouge has 59,000. In both cases, the large majority of the population is African American and the poverty level is very high. In both communities, roughly 50% of children are living in poverty. Parish-wide, child poverty is nearly half of that.

The individuals that work in the plant do not live anywhere near these facilities. If people in the community are able to secure the jobs in these factories, they are contracting jobs that are only temporary,

[146] http://www.oprah.com/spirit/Environmental-Activist-Hilton-Kelley-Port-Arthur-Texas.
[147] http://www.epa.gov/compliance/ej/grants/ej-showcase.html

offering low pay and no health benefits. These temporary jobs are also the most dangerous. For example, they might be asked to clean a tank, but are not told what was in the tank, or given any protective gear to clean it in. Even though the wages are comparatively high, they tend to leave after not very long, because they soon learn that they are putting their lives at risk.

People in these industrial communities are very concerned about their health. People are most concerned about respiratory issues and cancer. For people living near these facilities, whenever there is a strong odor being emitted, it's pretty much a given that this will cause an associated health issue. Because of this, people are afraid to go outside. Many times, people have reported that they've been out barbecuing on holidays, and yellow or black soot has fallen out of the air and all over the food and their kids. The younger kids that can't stand to stay inside all day often walk through the neighborhood with their shirts over their noses. For more details, see the reports available from the iWitness Pollution Map, http://oilspill.labucketbrigade.org.

It is very important for EPA to start assessing the cumulative impacts of multiple sources, particularly in the city of Baton Rouge. Currently, they are permitting by facility and not looking at the cumulative impact of the 19 chemical plants all being in one area, and with 59,000 people surrounding them. When you're only looking at one facility or one chemical at a time, you're never going to be able to protect the people who live around these types of complexes from the full impact of all of the sources and all of the pollution.

Cancer Alley, Louisiana:

The 80 mile stretch of Mississippi River between Baton Rouge and New Orleans, once revered by Mark Twain, is now dubbed "Cancer Alley."[148] This Louisiana area has the highest concentration of manufacturers, users, and disposers of toxic chemicals in the nation.[149] Hundreds of industrial plants are located near low-income communities of color and have been spewing out dangerous air toxins for decades.[150] The residents experience high rates of asthma, cardiovascular disease, diabetes, infant mortality, and cancer, including rare childhood cancers.[151] But the struggle to alleviate the strain of the cumulative effects of the pollution is continually impeded.

One iconic example is Convent, a mostly African American community, where 13.8% of the residents live below the poverty line.[152] Convent is on the East bank, and is the site of a new Nucor Steel plant, currently under construction. Sierra Club has raised a number of concerns during the permitting process about the impact of this plant on the community. Convent also is near the Motiva 'Donaldsonville Plant; a 'mid-stream' grain transfer facility; an Occidental Chemical Corporation facility producing Chlorine; and 2 large Fertilizer plants: one directly across the Mississippi River, and one downstream about 1.5 miles, which according to EPA documents, "may contain significant quantities of naturally occurring radioactive materials (NORM)."

[148] H2G2, *supra*, note 49
[149] Kluber, "Cancer Alley and Infant Mortality," *supra*, note 50
[150] H2G2, *supra* note 49.
[151] Kluber, "Cancer Alley and Infant Mortality," *supra* note 50, at 1.
[152] U.S. Census Bureau, *State and County QuickFacts:Convent, Louisiana*, U.S. Department of Commerce, http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

Subjected to a constant barrage of industrial air pollution, in 1996 the tiny town banded together when a Japanese company announced the opening of yet another polyvinyl chloride (PVC) plant. [153] Shintech, Inc. had applied for an air permit to build a $700 million PVC plant, which included three chemical factories and an incinerator; the permit would allow Shintech to release over 600,000 pounds of air pollutants annually.[154] Among these pollutants would be dioxin, a highly toxic substance known to cause reproductive and developmental problems, and increase the risk of cancer, diabetes, and heart disease.[155] Shintech would also be receiving nearly $130 million in subsidies from Louisiana, while providing only 165 jobs, most too technical for the surrounding poorly educated communities.[156]

Tulane University Law Clinic filed a Title VI complaint on behalf of the community affected by the Shintech Plant, and in 1999, Shintech rescinded its plans to build a plant in Convent.[157] This victory was short-lived, however, when just over a decade later, Nucor Steel succeeded in building a facility in Convent.[158] The iron-producing facility was permitted to release fine particulate matter, benzene, carbon dioxide, carbon monoxide, nitrogen oxide, sulfur dioxide, and ammonia into the air.[159]

Like Convent, the cities in "Cancer Alley" have been in constant struggle to strengthen protection for local communities, but are too often blocked by those who consider industrial development more important than local health. Without appropriate studies of the cumulative health impact on the local community, the residents will continue to be powerless to halt any further pollution encroachment.

The predominantly African-American neighborhoods of North Baton Rouge face the combined impact of point and non-point sources of pollution, and they need the permitting process to fully account for these impacts, as well as the additional burden caused by petro-chemical plant accidents.[160] In updating EPA policy on assessing the impacts of pollution on communities, there also needs to be analysis of emissions from transportation for the petrochemical plants, which also add significant pollution.

North Baton Rouge and Convent are joined by many communities and neighborhoods along the Mississippi River in Louisiana's Cancer Alley. The following are a few:

1. Plaquemine, LA, just a few miles down river on the west bank, is located near one of the largest Dow Chemical facilities in the United States. In addition to toxic air pollution, this plant has

[153] Louisiana Envtl. Action Network and Greenpeace USA, *Shintech Environmental Racism*, CorpWatch (Sept. 1, 1999), http://www.corpwatch.org/article.php?id=989.
[154] *Id.*
[155] National Institute of Envt'l Health Sciences, *Dioxins*, http://www.niehs.nih.gov/health/topics/agents/dioxins/#geninfo (last reviewed Jun. 5, 2013).
[156] *Shintech Environmental Racism*, *supra* note 6.
[157] *Id.*
[158] Tegan Wendland, *Nucor Breaks Ground on Plant in St. James Parish*, WRKF (Mar. 7, 2011), http://archives.wrkf.org/batonrouge&newsID=980.
[159] Jim Motavalli, *Shintech: The Battle Continues*, E Magazine, Mar. 1, 1999, *available at* http://www.highbeam.com/doc/1G1-54233048.html.
[160] Common Ground report (La Bucket Brigade & United Steelworkers 2012) is an analysis of refineries' reports to the state. The goal is to identify trends of problems so that accidents can be reduced. With over 200,000 people living within 2 miles of a refinery in Louisiana, there is a clear need to reduce accidents and eliminate exposure to hazardous chemicals; ExxonMobil Baton Rouge plant inspection report raises concerns; activists request full accounting of June benzene spill 12 Dec 2012 Times-Picayune; ExxonMobil Baton Rouge safety issues 'prevalent throughout refining sector:' United Steelworkers 27 February 2013 Times-Picayune.

serious ongoing ground water contamination issues, which impact a nearby drinking water well in a trailer park. Shintech PVC plant, and a host of others are within a 5 mile radius of the city.

2. St. Gabriel, located on the East bank, neighbors the only plant producing atrazine in the United States, and has a history of environmental-related health issues.
3. Geismar, also on the east bank, has a petro-chemical complex with 15 different plants, including BASF, Shell Chemical, and Williams Chemical, which had a major chemical accident just 2 weeks ago.[161] [162]
4. Donaldsonville, on the west bank, has a number of ammonia plants, including the CF Industries plant, which had a major accident last week[163]. The town's elementary school is less than ¾ of a mile from this plant.
5. Garyville and Loins, both on the East bank, are next door to the large Marathon Refinery. Lions, once a small community of freed slaves, has been largely displaced due to resulting impacts.
6. Taft and Hahnville, both on the west bank, are alongside Dow Chemical; Occidental Chemical Corporation; Waterford III, a nuclear power plant; Waterford I & II, natural gas power plants; Gypsy I & II, also natural gas power plants. Directly across the Mississippi River is the NORCO chemical complexes of Shell Oil, Motiva Refinery, and Valero Refinery.
7. Norco, located on the east bank, is near a Shell Chemical Plant, Motiva Refinery, and Valero Refinery. The community environmental justice struggles are well documented in two books: Diamond: A Struggle for Environmental Justice in Louisiana's Chemical Corridor Steve Lerner, and Night Fire: Big Oil, Poison Air, and Margie Richard's Fight to Save Her Town .
8. Kenner, on the east bank, has the Cytec Industries plant, which was formerly called American Cyanamid Company. This plant injects by a 'deep well,' the largest amount of chemical waste in Louisiana.
9. Chalmette is on the Eastbank below New Orleans, and has the ExxonMobil and Valero Refinery plants there. These plants have had serious spills over the last 10 years. The largest by volume was over one million gallons of crude oil by Murphy Oil, now Valero, during Hurricane Katrina. The ExxonMobil plant has had a series of leaks. A judge ruled in a Clean Air Act lawsuit, that the plant had violated the Clean Air Act 27,000 times in ten years. Earlier this year, there were a series of leaks.[164]
10. Chemical plant leaks during hurricanes add to the overall chemical exposure of residents of coastal Louisiana.[165]

[161] "Geismar explosion and fire released more than 62,000 pounds of toxic chemicals, company reports" 26 June 2013 Times-Picayune

[162] "'Cancer Alley' is on fire—where were the watchmen?" http://www.stuarthsmith.com/cancer-alley-is-on-fire-where-were-the-watchmen/#sthash.DhyIZ925.dpuf

[163] "Donaldsonville fertilizer plant blast leaves one dead, seven injured," 14 June 2013 Times-Picayune

[164] "ExxonMobil Chalmette Refinery likely cause of odor in city on Wednesday, Coast Guard says," 4 April 2013 Times-Picayune

[165] "Oil, chemical, coal releases during Hurricane Isaac should have been avoided, environmental groups say," 6 Sept 2012 Times-Picayune

Camden, New Jersey:

Camden, New Jersey once boasted a booming manufacturing industry. It is now known as the poorest city in the nation, with 38% of the population living below the poverty line.[166] Consisting primarily of African Americans and Latinos, this community is also plagued with high rates of asthma and cancer, including the second highest rate of cancer in the state and eighth in the nation.[167] The Camden area is home to over 100 toxic waste sites, many of which are localized around an impoverished neighborhood of Camden called Waterfront South.[168] Waterfront South encompasses 20% of the city's contaminated sites, and houses more than double the amount of pollution-generating facilities than the average New Jersey neighborhood.[169] The air toxins generated by these facilities include arsenic, lead, nickel, manganese, and cadmium, as well as fine particulate matter.[170] These air pollutants are often associated with respiratory illnesses, learning disabilities, and cancer.[171] Yearly, the area is also subjected to over 400 diesel ships in Camden Harbor and heavy diesel truck traffic throughout the neighborhood, adding to the overall levels of air pollution.[172]

In the early 2000s, when yet another cement plant obtained a building permit from the New Jersey Department of Environmental Protection ("NJDEP"), a small local organization persuaded Camden residents to band together to throw off the yoke of air toxins that has been choking their community.[173] In 2002, at the urging of the Waterfront South residents, the NJ Department of Environmental Protection initiated a study to analyze the impact of the toxic emissions on the air quality of neighborhood.[174] The study confirmed that the areas contained "relatively high particulate levels." [175] In 2011, the Health Effects Institute reported that Waterfront South qualified as a hotspot for fine particulate matter (PM 2.5), benzene, toluene, xylenes, aldehydes and methyl tert-butyl ether.[176]

The residents of Camden continue to be concerned about the cumulative effects of the multiple pollution-emitting facilities surrounding the area. Without further analysis of the cumulative risks of the air toxins, there is little to prevent additional facilities from opening.

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[166] U.S. Census Bureau, *State and County QuickFacts: Camden, New Jersey*, U.S. Department of Commerce, http://quickfacts.census.gov/qfd/states/34/3410000.html (last updated Jun. 6, 2013). *See e.g.*, Shoshana Guy, *America's "Invincible' City Brought to its Knees by Poverty, Violence*, N.B.C. News (Mar. 7, 2013), http://inplainsight.nbcnews.com/_news/2013/03/07/17225824-americas-invincible-city-brought-to-its-knees-by-poverty-violence?lite.

[167] Rollback Campaign, *Racial Discrimination and Environmental Justice*, YouTube (Apr. 14, 2008), http://www.youtube.com/watch?v=CA4vL0bFd18&feature=player_embedded.

[168] *Id; See also*, *S. Camden Citizens in Action v. New Jersey Dept. of Envt'l. Protection*, 274 F.3d 771, 774-75 (3d Cir 2001) ("Waterfront South contains two Superfund sites, several contaminated and abandoned industrial sites, and many currently operating facilities, including chemical companies, waste facilities, food processing companies, automotive shops, and a petroleum coke transfer station.")

[169] *Id.* at 775.

[170] Office of Environmental Justice, *Camden Waterfront South Air Toxics Pilot Project*, N.J. Dep't of Envt'l Protection, Division of Air Quality at 5 (2005), *available at* http://www.state.nj.us/dep/ej/camden/docs/finalreport.pdf.

[171] *Id.* at 4, 38, 46, 75.

[172] *Id.* at 21-22.

[173] Olga Pomar, *Fighting for Air*, National Housing Institute (December 2002), http://www.nhi.org/online/issues/126/camdenair.html.

[174] *Camden Waterfront South Air Toxics Pilot Project*, *supra* note 177.

[175] *Id.* at 5.

[176] Paul J. Lioy et al., *Personal and Ambient Exposures to Air Toxics in Camden, New Jersey*, Health Effects Institute at 2 (Aug. 2011), http://pubs.healtheffects.org/getfile.php?u=659.

Detroit, Michigan:

Michigan's most polluted zip code is 48217, located in the southwest of Detroit.[177] Wedged between a major highway and polluting factories, this community has acutely felt the burden of living so close to industrial plants.[178] The residents experience acrid odors, masses of floating dark particles, and thick layers of metallic dust that settle over the area.[179] The community, which is roughly 85% African American, has experienced deteriorating health due to its proximity to multiple industrial sites.[180] Asthma, sarcoidosis, and multiple types of cancer, including leukemia and brain cancer, have affected nearly every family in the area.[181]

Despite all this, the city continues to allow the industrial sector to expand, further elevating the level of pollution. In the past decade alone, air permits for an asphalt plant have been approved, the nearby water and sewer plant have expanded, and a composting facility was erected.[182] In 2007, the community opposed the $2-billion project to expand the Marathon Refinery and lost.[183] The State asserts that each industrial plant complies with the emissions limits, but the State fails to take into account the cumulative effects of the multiple facilities that are spewing out toxins into the air.[184] Although Detroit has seven state air monitors, none are located in this neighborhood, spurring the local residents to initiate their own sampling.[185] Their results showed high levels of lead and methyl ethyl ketone, a toxin that can irritate the lungs and affect the nervous system, in the air.[186] The cumulative effects of the nearby facilities must be considered in order to ascertain the level of harm associated with close proximity to these industrial sites and, ultimately, to finally bring relief to this industrial-inundated neighborhood.

Mebane, North Carolina:

Omega Wilson
West End Revitalization Association – WERA

In and around Mebane, North Carolina, there are multiple communities without access to basic amenities, such as sewage lines, paved roads, and clean drinking water.[187] These historic communities were established by freed slaves, and remain 85-95% African American. Over half of the population earns below $20,000 a year. [188]

In 1994, the City of Mebane intended to cleave these communities by charting a highway through Mebane's neighborhoods.[189] For an area already overburdened by leaking septic tanks and fetid

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[177] Tina Lam, *supra*, note 39.
[178] *Id.*
[179] *Id.*
[180] Andrea Newell, *Environmental Justice in Detroit: Hope Arises Amid Toxic Communities*, Triple Pundit (Jun. 10, 2013), http://www.triplepundit.com/2013/06/detroit-environmental-justice/.
[181] *48217*, *supra* note 39.
[182] *Id.*
[183] *Id.*
[184] *Id.*
[185] *Id.*
[186] *Id.*
[187] Sacoby M. Wilson et al., *Use of EPA Collaborative Problem-Solving Model to Obtain Environmental Justice in North Carolina*, 1 Progress in Cmty. Health P'ship: Research, Educ., and Action 327 (2007), http://rogersroad.files.wordpress.com/2008/05/14wilson.pdf.
[188] Id. at 328.
[189] *Timeline of Obstacles and Accomplishments*, WERA http://www.wera-nc.org/timeline.htm (last visited Jun. 20, 2013).

drinking water, the four-lane highway would be adding an additional level of pollution from the vehicles passing through the neighborhoods. In response, local residents established the West End Revitalization Association ("WERA") to contest the building of the highway.[190] In 1999, WERA filed civil rights and environmental justice complaints to the U.S. Department of Justice, asserting that the proposed highway disproportionately affected the African American communities. As a result, the plans for the highway were put on hold.[191]

Even though the community prevented the building of a highway, they still face widespread failing septic systems and contaminated water.[192] The City of Mebane, while controlling the land use of these communities, continually refuses to annex the neighborhoods or provide basic amenities.[193] In 2002, WERA received a small grant from the EPA to conduct a study of the water in the African American communities.[194] A study of the surface water showed the presence of *E. coli* and *Enterococci*, bacteria caused by human fecal matter.[195] These levels exceeded EPA's maximum containment limits and violated the North Carolina statute limiting fecal coliforms in waters used for recreation purposes.[196] This surface water flows through the land of the African American residents, is accessible to children, adults, and animals, and has been attributed to the death of pets that drank the water.[197] The community is also concerned about the many abandoned factories – some of which are being used as residential housing without adequate cleanup.[198]

The understanding of cumulative impact must be broadened to include the lack of compliance by local and state federal officials, planned construction projects, and the lack of basic amenities in low-income communities of color, such as safe drinking water, sewage systems, and stormwater management.

Washington, D.C.: Anacostia River Area

The Anacostia River, frequently referred to as the "Forgotten River," has suffered neglect over the past 100 plus years, leading it to being placed on the list of the 'Ten Most Polluted Rivers in the Nation." Challenged by a mix of deforestation due to rapid development, and dense population growth in the watershed, the river is extremely sedimented, with over 35 feet of fine silt lying along its forty foot depths. The river is no longer used for commerce and the silting is not an issue for navigation, but it serves as a base of a toxic soup. Toxic chemicals have leaked into the river from former industrial sites along its shores, millions of gallons of untreated sewage from the city's antiquated combined sewer outfall system flush into it annually, and tens of thousands pounds of trash and debris float downstream after each rainstorm or snow melt.

The problems associated with the river have been the result of the accumulation of pollutants from point and non-point sources, including federal and local governments, and local companies. The issues of the Anacostia are further complicated by the fact that though the tidal river is largely in the confines of the District of Columbia (a small segment of the headwaters lies within Maryland), the vast

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[190] *Failing Septic Systems and Contaminated Well Waters: African-American Communities in Mebane, North Carolina*, West End Revitalization Association 5 (Dec. 30, 2002), http://www.wera-nc.org/News/epa/epaej_1202.htm.
[191] *Id.*
[192] *Id.* at 6.
[193] *Id.*
[194] *Id.*
[195] *Id.* at 14
[196] *Id.* at 15
[197] *Id.*
[198] *Failing Septic Systems*, *supra* note 197, at 17.

majority (80 percent) of the watershed spans the Maryland counties of Montgomery and Prince George's County.

Until recently, this span of sources has been addressed piecemeal. With all of the various sources, multiple, sometimes overlapping, the problems facing the river can often seem overwhelming to the local community. A comprehensive problem requires comprehensive actions. Pollution, especially in our air and waters, does not respect political boundaries. The EPA needs to exercise oversight in cooperation with the District's Department of the Environment, the Maryland Department of the Environment, and their counterparts in the local counties, in assessing cumulative impact and taking the appropriate actions to address these types of problems.

Ivy City, Washington, D.C

In the very heart of Washington, D.C. lies Ivy City, a small neighborhood that is unrecognizable from the iconic tree-lined streets of the nation's capital.[199] This neighborhood is home to a largely African American community. Unemployment nears 50 percent. [200] This pocket of the city is sandwiched between three major D.C. roads, which create high amounts of vehicular pollution.[201] The neighborhood also hosts countless government vehicles, including snowplows, salt trucks, and school buses, all of which add to the cumulative air pollution.[202] Vehicle exhaust is known to contain multiple toxins, such as nitrogen oxides, sulfur oxides, and particulate matter, such as metal and soot.[203] These toxins are known to increase the risk of cardiovascular disease, asthma, respiratory failure, and lung cancer.[204]

The elevated vehicular pollution levels have already yielded multiple cases of respiratory problems in the neighborhood.[205] In 2012, the mayor decided to build a bus depot in the lot adjacent to a historic century-old school in the heart of Ivy City.[206] This uptick of diesel-burning vehicles would add yet another layer of pollution in an already overburdened community. Diesel exhaust contains over 40 air toxins, including known carcinogens such as benzene, arsenic, and formaldehyde.[207] Exposure to diesel can aggravate asthma attacks and cause respiratory illnesses and cancer.[208] Furthermore, the residents had successfully campaigned to designate the school a historic site a decade earlier, and had hoped to use the building as a recreation and education center with activities for children and job training for adults.[209] The planned bus depot, an abrupt departure from the city's promise to revitalize the community, incited

[199] David Alpert, *Environmental Justice for Ivy City*, Washington Post Opinions (Dec. 14, 2012), http://articles.washingtonpost.com/2012-12-14/opinions/35846642_1_street-trees-neighborhood-environmental-justice.
[200] Darryl Fears, *Ivy City, Tired of Being a D.C. "Dumping Ground," Takes on Gray Over Bus Depot*, Washington Post (Aug. 12, 2012), http://articles.washingtonpost.com/2012-08-12/national/35492485_1_bus-depot-boltbus-suit-claims.
[201] *Environmental Justice for Ivy City*, *supra*, note 206.
[202] *Ivy City, Tired of Being a D.C. "Dumping Ground," supra* note 207.
[203] Doug Brugge et al., *Near-highway Pollutants in Motor Vehicle Exhaust*, 6 Envt'l Health 23 (Aug. 9, 2007), *available at* http://www.ehjournal.net/content/pdf/1476-069X-6-23.pdf.
[204] *Id.*
[205] *Ivy City, Tired of Being a D.C. "Dumping Ground," supra* note 207.
[206] *Id.*
[207] Cal. EPA, OEHHA, *Health Effects of Diesel Exhaust*, http://oehha.ca.gov/public_info/facts/dieselfacts.html.
[208] *Id.*
[209] *Ivy City: Community Fact Sheet and Needs Assessment*, Empower DC (February 2012), http://empowerdc.org/images/Ivy%20City%20Facts.Needs%20Assessment.pdf.

the residents of Ivy City to fight back in court.[210] In December 2012, the judge, after taking a tour of the neighborhood,[211] granted a preliminary injunction and admonished the city administration for circumventing "environmental screening by mischaracterizing the project."[212] Despite this victory, the struggle continues for these residents as they attempt to breathe life into an over-polluted neighborhood that is described as the vehicle "dumping ground" of Washington, D.C.[213]

Cumulative Impacts on the Navajo Nation

EPA is well aware that resource extraction on the Navajo Nation, particularly uranium mining, has left a toxic legacy of contamination from waste material and abandoned mines that has not yet been remediated. The Environmental Justice department of the Sierra Club in Flagstaff, AZ, agrees that there is ongoing work to remediate the toxic effects of uranium mining. We would also like to speak to the exceptional risks that uranium pollution in the water, air, and soil, pose to communities on the Navajo Nation and surrounding communities.

For example, the five-year plan that the EPA is currently proposing in the Grants Mineral Belt region, should be re-evaluated and expanded. Residents in small, rural communities face extreme pollution threats. The residents, who live, raise livestock and garden on soil that releases radon, must pay for municipal water in order to avoid the contaminated local wells that traditionally provided water for free. Starting in 1958, a company, now owned by the Barrick Gold Corporation, placed 21 million tons of uranium tailings into an unlined pond. They promised nearby residents of Bluewater Valley that no contamination would spread beyond the alluvial water aquifer into underlying aquifers on which the residents relied. But by 1995, the contamination had spread from the alluvial into three lower aquifers, effectively ending residents' use of wells.[214] The EPA's attention to this region today, recognition of the need for safe, local water for the Grants Mineral Belt communities, and the agency's efforts in the community are greatly appreciated, but EPA's plan should recognize that the community's private property has already been destroyed and water use now is expensive and must be curtailed, changing the way people in the community can live.

Bluewater Valley also requires additional support, due to existing health conditions related to living with over 30 years of contamination—the extent and impact of which has not been fully documented. Only recently has the area been assessed for human health risks. The EPA's report found residents south of the tailings site face "cancer risks 18 times higher than EPA's 'generally acceptable risk' range for radionuclides in outdoor air among other increased risks," and the area north of the tailings site still lacks sufficient monitoring wells to determine if contamination from the Ambrosia Lake region is affecting the community.[215] The monitoring wells that do show contamination from the Anaconda/Arco/Bluewater site entering the community from the west, may be inadequate to fully understand the problem. No measures have been taken to protect the San Andres aquifer that grows food

[210] Sherrie Johnson, *Ivy City Community Demands Job Training Not Bus Parking at Crummel School*, ABC2 News (Jul. 17, 2012), http://www.abc2news.com/dpp/news/education/ivy-city-community-demands-job-training-not-bus-parking-at-crummell-school

[211] Tom Sherwood, *Ivy City Residents Fight Bus Depot at Crummel School Site*, NBC4 Washington News (Nov. 26, 2012), http://www.nbcwashington.com/blogs/first-read-dmv/Ivy-City-Residents-Fight-Bus-Depot-at-Crummell-School-Site-180938721.html

[212] Courtland Milloy, *For Ivy City, 'The Plan' Isn't Paranoia*, Washington Post Local (Dec. 11, 2012), http://articles.washingtonpost.com/2012-12-11/local/35767596_1_bus-depot-low-income-people-residents

[213] *Ivy City, Tired of Being a D.C. "Dumping Ground," supra* note 207.

[214] (Candace Head-Dylla, 2013, personal communication, 2013)

[215] (TAG grant summary of EPA Draft Human Health Risk Assessment, 2013)

for the livestock in Murray Acres.[216] In order to adequately address the risks of contamination in Bluewater Valley and in the Grants Mineral Belt as a whole, the Sierra Club Environmental Justice Department asks that the EPA take pre-existing health risks from contamination and social factors—including, in this case, the ways air, water, and soil sustain rural lives—into account.

We ask that the EPA recognize that communities around power plants, especially communities with significant Native populations, are at extreme risk of industrial pollution, as a result of social factors that pressure the community to accept pollution in exchange for jobs. The EPA's support is vital to enforcing workplace health standards, protecting surrounding communities from pollution from the mine, and developing economic alternatives, such as solar or wind energy, to provide communities with productive pathways to economic independence.

Bluewater Valley Downstream Alliance. (2013). *Summary of the USEPA Draft Human Health Risk Assessment*. Community newsletter funded by a Technical Assistance Grant from the USEPA.
Sierra Club. (2012). DRAFT: *Socioeconomic and demographic indicators: identifying and enumerating the state of EJ communities*. Dave O'Donnell.
United States Environmental Protection Agency. (2013). *EPA five-year plan progress report on cleaning up uranium contamination*. San Francisco: Dana Barton.
United States Environmental Protection Agency. (2013). *Assessment of health and environmental impacts of uranium mining and milling five-year plan—Grants Mining District, New Mexico*. Dallas: Mark Purcell.

Memphis, TN:

The Memphis Metropolitan Statistical area is typical of most large and mid-sized urban southern cities, in that they historically attracted heavy industrial areas. These industrial areas are usually in or around neighborhoods where a majority of residents are people of color.

While the City of Memphis is burdened with air pollution coming from a wide variety of sources, there are two parts of the city that bear a disproportionate burden compared to other sections of the city, or Shelby County. The Douglass neighborhood located in a section of north Memphis, has eight polluting facilities including the Hollywood Dump Superfund site and Velsicol Chemical Company's hazardous waste incinerator and a six-lane interstate highway runs alongside its northern border. Many of the polluting facilities have been present in the community and operating (under different names/owners) for more than 50 years. The Douglass neighborhood makes up the majority of the 38108 zip code area. The 38108 zip code area is an historically African-American neighborhood with a huge number of low-birth weight babies and a high infant mortality rate. Infant mortality should be a health indicator that calls attention to the negative health exposures from the cumulative industrial pollution and contamination sources. EPA must protect children and all communities exposed to pollution early in life, or the cycle of chronic illness and poor health will increase.

The south west area of Memphis, TN, is comprised of several historically African-American neighborhoods that are in close proximity to the Presidents Island industrial corridor, the Valero (oil) Refinery, and the fifty-five year old TVA Allen coal-fired power plant. These two areas of the city are dealing with multiple pollution sources.

[216] (Candace Head-Dylla, 2013, personal communication)

In addition, community members have complained for years about the strong odors coming from the area facilities, as well as the asthma, various cancers, miscarriages, and even deaths that they attribute to the environmental exposure to hazardous substances in their community.

Because pollution is considered to be a serious community health problem, the Sierra Club Environmental Justice Program office in Memphis monitors emissions coming from local facilities and compiles an annual report entitled, "Shelby County's Terrible Ten Report."[217] This report uses Toxic Release Inventory (TRI) data that the facilities are required to report to EPA each year estimating their emissions. Additionally, the report combines TRI data with health effects information on each of the toxic chemicals emitted, to help educate the community about the complex issue of air pollution. This easy-to-understand report has for ten years made an effort to raise awareness and draw attention to the top ten major sources of pollution to our air, water, and land.

Because we know the health effects of the many hazardous substances that are emitted, we are very concerned about the cumulative and synergistic health effects. We know based on the science that toxic air pollution particularly affects the elderly, pregnant women, and children. Even so, EPA does not mandate hazardous air monitors; not even in 'hot spot' areas. Air pollution, land pollution, and water pollution usually go hand-in-hand. Whether we are considering the health effects from air pollution, solid waste facilities, or from eating fish from contaminated rivers and streams, the health effects are cumulative ones in most environmental justice communities. Yet, community residents are faced with on-going pollution as well as the renewal of facility permits, continuously exposed.

[217] An example can be found at http://www.sierraclub.org/ej/downloads/terrible10.pdf