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John Faust
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1515 Clay St., Suite 1600
Oakland, CA 94612

Dear Dr. Faust,

Thank you for the opportunity to comment on the draft CalEPA EnviroScreen documentation. I was pleased to have the opportunity to review and comment on this important work and appreciate the support provided by the California Chamber of Commerce to do so. I prepared these comments as part of my work as an employee of Toxicology Excellence for Risk Assessment (TERA), an independent scientific organization. My comments reflect my opinions based on my review of the documentation, as modified and enhanced based on the comments and discussion at the September 7 academics workshop in Oakland. As a board-certified toxicologist, I have focused my comments on issues related to toxicology and risk assessment issues.

Overview

Overall, I agree that it is useful to have a screening tool to aid in prioritization and provide additional insight into cumulative risk. Prioritization is essential in today's economy, because it helps target limited resources for the biggest health impact. My key points:

- The documentation needs to be consistent in communicating that the purpose of the tool is prioritization, and that the screening tool is not sufficiently robust for regulatory decisions.
- The current document does not include sufficient detail on the basis of decisions and the approach used (including approaches chosen and reasons or criteria for rejecting other approaches) to provide the transparency necessary for others to fully evaluate this important tool and how it should be used.
- Improvements to the "exposure" indicators are needed to better reflect both exposure and the impact of those exposures.

- The purpose of the "environmental effects" component should be clarified, and the specific indicators further evaluated to ensure that they reflect *adverse* (or potentially adverse) conditions.
- The "public health" component does not distinguish between health effects due to socioeconomic factors or other social stressors and those due to chemical exposure. Knowing which stressors have the largest impact on health is important to identify interventions that have the largest impact.

Complete Comments

Goals and Purpose of the Document

At the September 7 Academics Workshop, Dr. Solomon stated that the purpose of the screening tool is to aid in prioritizing agency actions statewide. She noted that the key goal is to have a scientifically defensible, practical and valid screening approach. I concur with the importance of the purpose and goals. Clear and consistent communication of the purpose of this document and tool is important to ensure that the tool accomplishes the stated goals, and its use does not result in unintended consequences that may be harmful to human health.

The model, particularly with the modifications discussed below, will be useful for prioritization of communities. However, the purpose of the model needs to be clearly described, including explicitly noting that this is a screening tool that can be used to broadly rank geographic areas for the purpose of prioritizing resources. The screening is not a risk assessment - it does not characterize hazard, estimate exposure, or calculate risk to individuals or populations, and therefore is not appropriate to use on its own to recommend regulation or make permitting decisions

Transparency

CalEPA has substantially developed this methodology between the 2010 publication of the Cumulative Impacts Report and the July 30, 2012 Draft CalEnviroScreen Proposed Method and Indicators documentation. As part of this development, CalEPA has narrowed the focus from the wide range of potential topics and indicators noted in the 2010 report to the actual proposal. However, substantial additional documentation is needed in order to be transparent about the basis of the key choices made. Additional explanation and documentation are needed for the following items:

- The basis for the choice of components and for the weightings (range of scores) for each of the components
- The basis for the choice of indicators
- Other indicators that were considered, and the reasons for not choosing them.
- The basis for combining components in a particular manner (adding and/or multiplying them), and implications.

Documenting the basis for these choices will aid substantially in allowing independent scientific evaluation of the approach as it continues to be developed, and evaluation of whether the tool is the best approach to meet the stated goals. In order to retain the user-friendly organization and style of the current document, I would recommend putting the details in a separate document, or in an appendix.

I would also recommend that the model and intermediate calculations should be made available to allow a better understanding of how the model works and how to run it.

Selection of Indicators

My comments focus on the components categorized as "pollution burden" measures, and issues related to the choice of the indicators for these components.

"Exposure" Indicators

I was pleased to see that CalEPA includes both hazard and exposure-related elements for several of the indicators. This approach of ensuring that the indicators reflect both hazard and exposure (not just the presence of a source) could be further developed by the following modifications:

- The **pesticide** indicator considers hazard, as well as volatility, as a surrogate of exposure, but the authors need to consider how the application conditions and degree of control (e.g., application allowed only under tents or other containment barriers) affect exposure. Highly toxic pesticides are tightly regulated and generally applied with a high degree of control, which would substantially decrease exposure to these chemicals relative to exposure to less toxic pesticides, such as those allowed for general household use.
- As also noted by panelists at the September workshop, other measures may be better than the **TRI/RSEI** data as an indicator for exposure to air toxics.
    - One possible source of data is the National Air Toxics Assessment (NATA), which has the advantage of including both stationary and mobile sources (compared with only stationary sources covered by the Toxic Release Inventory [TRI]). NATA is generally considered a more accurate estimate of actual concentrations in air than TRI data, which is based on estimates of releases. However, as noted at the workshop, some substantial errors have been reported in some NATA data, and CalEPA should ensure that such errors have been corrected prior to use of NATA data.
    - The workshop panel members also suggested that more finely-grained California-specific data may be available from the Air Resources Board (ARB).
    - I concur that CalEPA should further investigate the use of such data from the ARB and NATA data, combined with an appropriate measure of hazard (i.e., toxicity), to replace the TRI indicator.
    - If CalEPA does continue to use data from TRI, I agree with CalEPA's approach of using the TRI data as weighted by EPA's Risk-Screening Environmental

Indicators (RSEI) method, rather directly using TRI data. However, I would recommend a different measure from among the alternatives presented by RSEI. RSEI provides 3 different sets of measures, described as "pounds-based," "hazard based," and "risk-related." If TRI/RSEI data are used, the measure should use the risk-related endpoint (calculated as the product of a dose estimate, a toxicity weight, and estimate of population exposed) rather than hazard-weighted pounds (the hazard-based measure).

- For **ozone** and **PM2.5**, the indicator is defined in terms of the average concentration. The reason for this choice is unclear. I would recommend that the indicator measure for the criteria pollutants reflect the health-based ambient air quality standards. Since these standards are intended to be health-protective, a measure linked to the standard would more directly reflect potential health effects resulting from exposure to the criteria pollutant. For example, CalEPA might consider a measure such as days of exceedance of the health-based air standard. Regardless of the choice, the basis for the choice of measure should be provided. A population-weighted measure should also be considered and the reason for choosing whether or not to do population weighting should be provided. Similarly, the basis for the choice of only two criteria pollutants (ozone and PM) as indicators should be documented.
- It is not clear whether traffic density adds meaningfully to the exposure measures, particularly if NATA or another measure of air toxics that includes exposure from mobile sources is used; exposures from criteria pollutants are addressed by other indicators. A sensitivity analysis would be useful for determining whether traffic density (or an alternative indicator) adds meaningful independent information to the analysis.

"Environmental Effects" Indicators

The draft document is unclear about the reason for including the "Environmental Effects" component and what it is trying to capture. At the September workshop, CalEPA staff clarified the intent as addressing "adverse conditions." If CalEPA retains this component, the intent and the definition of "adverse conditions" should be explicitly documented. In particular, it is important to ensure that the measures used for the various indicators in this component truly have the potential for being adverse to the local population, and that the scoring system reflects the level of adversity (or potential adversity). Where feasible, measures reflecting exposure (as opposed to only the *presence* of a hazard) should be included. I would recommend re-consideration of the scoring system for cleanup sites. According to Appendix A2, cleanup sites listed as "certified," "completed," or "no further action" (i.e., the "low status" category) receive scores ranging from 2 to 8, depending on the *original* nature of the site (e.g., Superfund site vs. voluntary cleanup). Based on the definitions provided[1], it appears that the sites in the "low status" category have been fully remediated and returned to normal use, and so it is puzzling why these sites received a non-zero score if there is no current risk of exposure or health impact. If a

[1] Certified is defined as "completed sites with previously confirmed release that are subsequently certified by DTSC as having been remediated satisfactorily under DTSC oversight." No further action is defined as "completed sites where DTSC determined after investigation, generally a PEA (an initial assessment), that the property *does not pose a problem to public health or the environment*" (emphasis added). Completed is not defined in the appendix.

portion of the "low status" category has not been fully remediated, perhaps that portion of the category should be separated out. Similarly, it is not clear whether the "medium" status group involves the potential for human exposure. Even for sites that have not been cleaned up, the health impact is generally very local. If the intent is to capture (potential) adverse effects on human health, it may be useful to further categorize sites by the type of contamination; soil contamination generally has little potential for off-site exposure (aside from dust exposure during remediation), but groundwater and air emissions can result in more off-site contamination.

"Public Health" Component and Indicators

The purpose and utility of the public health component should be clarified. Currently, the component is in many ways more reflective of "population characteristics" than "pollution burden" (the two groups of components in the current model). The four indicators that comprise this component have multiple contributing factors, such as diet, health care, genetics, environmental exposures, lifestyle, and occupational exposure. Many of the indicators have a strong correlation with socio-economic status (SES), and clarifying the contribution of these other factors is important when determining the degree of association with environmental exposures (if any) in any given population. August et al. (2012) [2] conducted a useful sensitivity analysis of the draft model, and noted only a moderate correlation between the exposure indicators and the public health effect indicators. As suggested by August et al., one interpretation of this result is that the public health component adds additional important information. I agree that the result of the correlation analysis means that there are factors other than those contained in the exposures component driving the public health measures, and I suggest that many of these factors are not in the "pollution burden" column. Even the degree of correlation observed does not necessarily imply causation.

Because the purpose of the screening tool is to prioritize communities, with one result of prioritizing being grants for interventions, it is important to distinguish between health effects due to socioeconomic factors or other stressors, and those due to chemical exposure; this differentiation allows one to understand what is driving health effects. Lumping the public health component with the "pollution burden" measures has the potential for double-counting (to the degree that the public health indicators reflect health effects caused by other indicators in the "pollution burden" group). Perhaps more importantly, this lumping loses information that is needed in determining the most important drivers for health effects. Correct identification of those drivers is important for effective targeting of interventions (e.g., reducing exposures vs. improving access to health care), and thereby obtaining the largest public health impact per dollar spent.

[2] August, L.M., J.B. Faust, L. Cushing, L. Zeise, and G.V. Alexeef. 2012. Methodological considerations in screening for cumulative environmental health impacts: Lessons learned from a pilot study in California. Int J Environ Res Public Health. 9:3069-3084.

Model and Sensitivity Analysis

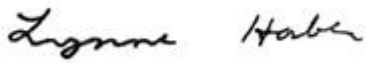
The model used higher weighting for chemical exposures based on higher confidence in scores, but it was not clear why confidence, rather than predictivity of the outcome of interest (public health impact), was the primary determinant of the weighting approach. If a weighting approach is used, rather than the simple additive approach, as was suggested by several panelists at the academic workshop, the weighting should reflect the relevance of each component to the ultimate goal.

The draft document explained the rationale for multiplying "pollution burden" and population characteristics based on analogy to the use of a human variability sensitivity factor in chemical risk assessment. However, the analogy to traditional uncertainty factors may not apply to this model and the rationale for a multiplicative approach in this context is not well-validated. A thorough sensitivity analysis is needed to help evaluate and determine the appropriateness and implications of multiplication vs. addition of components.

The initial sensitivity analysis done by August et al. (2012) is a good first step; however, additional analyses are needed. August et al. used a single small sample; this analysis should be repeated with a larger sample, perhaps using multiple sampling techniques. The sensitivity analysis should also evaluate multiple approaches for weighting indicators (i.e., the range of scores possible). I concur with the suggestion by one of the panel members that the model should be tested using at least a simple 2 x 2 matrix of high/low vulnerability based on SES, and high/low exposure, and ensure that the prioritization is consistent with the policy intention. I also agree with the panelist suggestion that the indicators should be tested for their impact on the overall ranking, by individually removing the indicator, and seeing if the ranking changes substantially. If the ranking does not change, that indicator does not provide useful additional information, and can be removed from the model.

I appreciate the opportunity to provide my comments on this important project, as part of TERA's mission to support the protection of public health.

Sincerely



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