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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

June 7, 2007

MEMORANDUM

SUBJECT: CASAC Review of the Draft Approach in Support of the Lead Renovation, Repair, and Painting Rule

FROM: Cathy Fehrenbacher, Chief for Diana Locke
Exposure Assessment Branch
Economic, Exposure and Technology Division (7406M)
Office of Pollution Prevention and Toxics

Jennifer Seed, Chief
Existing Chemicals Assessment Branch
Risk Assessment Division (7403M)
Office of Pollution Prevention and Toxics

TO: Fred Butterfield, Designated Federal Officer
Clean Air Scientific Advisory Committee
EPA Science Advisory Board Staff Office

THRU: Wendy Cleland-Hamnett, Deputy Director
Office of Pollution Prevention and Toxics (7401M)
Office of Prevention, Pesticides, and Toxic Substances

Attached is the draft document entitled "An Approach for Estimating Changes in Children's IQ from Lead Dust Generated during Renovation, Repair and Painting in Residences and Child-Occupied Facilities" that is being developed to support the Lead Renovation, Repair, and Painting (LRRP) Rule prepared by the Environmental Protection Agency's (EPA) Office of Pollution Prevention and Toxics (OPPT). The Charge questions to be used to focus the discussion of the CASAC Panel are included below. We request that you forward the attached document, together with this memorandum to the CASAC Lead Panel to prepare for that review.

In February, 2007 the CASAC provided comments on the draft Assessment Plan. During the February consultation, OPPT explained that the assessment was being developed for use in the economic analysis that will be conducted in support of the final LRRP. It is important to note,

for this rule. The LRRP rulemaking is primarily based on a TSCA Title IV statutory requirement that EPA revise the lead abatement regulations to apply to renovation and remodeling activities that create lead-based paint hazards. The statutory term "lead-based paint hazards" includes, but is not limited to any condition that causes exposure to lead from lead-contaminated dust and lead contaminated soil. EPA has already promulgated quantitative lead-based paint hazard standards. Thus, a primary consideration in developing the regulations is the extent to which the lead-based paint hazards resulting from renovation and remodeling activities are eliminated. This is different from other TSCA rulemakings in which a "no unreasonable risk" determination must be made. As with other rulemakings, which are determined to be "significant regulatory action[s]" under Executive Order 12866 - Regulatory Planning and Review, EPA is required to conduct an economic analysis of the costs and benefits associated with the rulemakings. Further, OMB Circular A-4 provides guidance for conducting sensitivity analysis of "economically significant" rules, which would apply to this rule under Executive Order 12866.

The benefits to be analyzed quantitatively in the economic analysis are changes in neurocognitive function in children (as measured by IQ) due to lead exposure from specific renovation, repair and painting (RRP) activities. OPPT is using data from a variety of sources to determine the specific types and frequencies of renovation, repair and painting (RRP) activities that occur in residences and child-occupied facilities. There are obviously many types and ranges of RRP activities that can occur in any given residence or child-occupied facility. Thus, one residence may have a kitchen remodeled, another may have one room repainted, and another may have multiple activities such as window replacements, painting, and a kitchen and bathroom remodeled. OPPT is currently examining the types and number of RRP activities or combination of activities that may occur in U.S. residences and child-occupied facilities; while some grouping may be possible, the number is anticipated to be in the hundreds.

Since February the project has evolved, and the scope has been modified somewhat. The draft Assessment Plan stated that OPPT would characterize the distribution of IQ loss due to the resultant lead exposure for each of the specific RRP activities. This information would then be used to "build" all the houses and child-occupied facilities required for the economic analysis. However, as the project progressed it became evident that it is not possible to estimate changes in IQ associated with multiple RRP activities by simply adding the IQ changes associated with individual RRP activities. Thus, it was necessary to modify our approach.

OPPT has therefore developed the methodology that can be used to estimate changes in children's IQ from lead exposure due to a variety of RRP activities in residences and child-occupied facilities (COFs). This document describes that approach. The approach is designed to characterize lead exposures in residences and COFs, with and without the various control options. This method can then be applied repeatedly to "build" all the houses and COFs required for the economic analysis. Two examples are provided to illustrate the approach presented in this document. The first is for a residence with a single RRP activity, window replacement. The second example is for a residence with multiple RRP activities including a bathroom renovation, a kitchen renovation, 10 door or window replacements, interior painting, HVAC work, electrical wiring work, plumbing work, and installation of a security system. These examples are for illustrative purposes only, and should not be used to draw conclusions about potential risks or the efficacy of the control options in the proposed rule. We are requesting review comments on our methodology prior to starting the extensive step of applying the methodology to numerous scenarios in the subsequent economic analysis.

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1. Please comment overall on the Approach and its utility for "building" all of the houses and COFs required for the economic analysis. Please comment on the clarity and transparency of the document.

2. Sensitivity and Monte Carlo Analyses

The approach of this document assumes that variable reduction (reduction of the number of potentially influential factors carried through the analysis) is carried out following a sensitivity analysis, and that Monte Carlo analyses permit the estimates to account for magnitude of uncertainty as well as variability.

a. The document describes a sensitivity analysis for each of the two examples. They suggest which factors are important to describe the features of Pb exposure. The examples, however, provide only a sense of the impact on that particular example and not necessarily for the whole. Please comment on the strengths and weaknesses of the sensitivity analyses. Please comment on whether the sensitivity analysis using the two examples is sufficient to characterize the factors that are most important for determing Pb exposure or should a separate sensitivity analysis be conducted for each of the houses and COFs that will be "built" for the economic analysis.
b. The document describes Monte Carlo analyses for each of the two examples. Please comment on the strengths and weaknesses of the Monte Carlo analyses. Please comment on whether the Monte Carlo analyses using the two examples is sufficient to characterize the variability in Pb exposures or should a separate Monte Carlo analysis be conducted for each of the houses and COFs that will be "built" for the economic analysis.
c. Dust study results that are observed to be nonmonotonic across increasing Control Options will likely translate into similar patterns following application of the approach to estimate IQ changes. IQ change models only use geometric means from the dust study. Please comment on the usefulness of an additional Monte Carlo step as the way to account for the variances in the dust study.
d. The blood Pb models assume that variability in the population around any mean blood Pb is approximately that displayed in the general population. The assumption that the estimated mean blood lead values are accompanied by geometric standard deviations of 1.2 is made explicit in the IEUBK model documentation and is extended implicitly in these analyses for the Leggett model. Nonetheless, the assumption currently is not discussed in the description of the Approach given to the CASAC nor would it be displayed numerically in any results from its application; the approach shown carries out all simulations during one phase of analysis. A Monte Carlo step between the application of the blood lead model and a model for estimating changes in IQ would expand the characterization of differences between similarly aged children experiencing the same RRP activities. Please comment on the usefulness of an additional Monte Carlo step between the application of the blood lead model and the IQ change model as the way to display differences.

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e. In addition to the aspects addressed by 2b-2d, the document mentions several ways in which assumptions have been incorporated into the approach in a deterministic fashion. Please comment on the strengths, weaknesses, and necessity of introducing additional Monte Carlo analyses or markedly changing these assumptions, and whether these would be applied to each of the houses and COFs that will be "built" for the economic analysis.

3. Blood Lead Modeling

The document describes use of the Leggett and IEUBK models for each of the two examples. Both models are used because exposures to Pb from RRP activities are anticipated to be of short duration, and fluctuate frequently. In this context, applying the IEUBK to estimate the impacts of short-term fluctuations in Pb exposure (weekly in this approach) may stretch the IEUBK to the limits of its temporal resolution. Both models are used in this document to display the impact of model uncertainty. The two examples presented in this document show that predictions by the Leggett model are about three times those predicted by the IEUBK. This is consistent with the findings of Pounds and Leggett (1998) who compared predictions from the Leggett model with the deterministic predictions of blood Pb levels generated by the IEUBK model, using the IEUBK default inputs. In addition, the relative difference between the two models seems to be similar for single and multiple RRP activities. Please comment on whether both the IEUBK and Leggett models should be used to estimate blood Pb levelsfor all of the houses and COFs that will be "built" for the economic analysis.

4. Estimates of IQ Change

This document describes the use of two strategies to address the limitations and uncertainties associated with the log-linear IQ model. Please comment on the strategies EPA has used to address limitations and uncertainties. Have these limitations and uncertainties been accurately and transparently described? These include the use of a log-linear model with a "cutpoint" of 1 ug/dL blood Pb and the use of a piecewise linear model. Both models are drawn from Lanphear et al (2005). The coefficient for the piecewise linear is derived from concurrent blood Pb levels. Both models, however, are being used with lifetime average blood Pb values in the context of this document. Please comment on the strengths and weaknesses of the models. Please comment on whether both the log-linear IQ model and the piecewise linear model should be used for all of the houses and COFs that will be "built" for the economic analysis.

5. Adaptation of Approach for Child-Occupied Facilities

With the range of potential COF configurations, the fact that children may spend most of their time in a limited part of the COF, and the fact that there may be multiple children under age 6 in different rooms of the same COF, there is no simple way to develop a COF-wide loading estimate. The proposed approach would estimate the Pb loadings in three different types of rooms in a COF (workspace, adjacent, and rest of COF) by assuming that all RRP activities take place in the same workspace. It is proposed that loadings in each room would be estimated for each type of activity individually and then composite loadings would be estimated for each multiple activity scenario by summing the relevant activity-specific loadings for each type of

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room. The estimated loadings for the workspace would therefore represent the high-end exposure scenario, the rest of COF would represent the low-end exposure scenario, and the adjacent room would represent the mid exposure scenario. Please comment on the strengths and weaknesses of the overall approach for COFs.

6. Adaptation of Approach using Age of Housing

The HUD surveys of lead-paint in housing indicates that the level of lead in paint will vary by the age of the housing and housing component. The OPPT Dust Study included houses dating from around 1920 and a school built in 1967. The lead levels in the lead-based paint in the OPPT Dust Study varied considerably. The Approach uses lead loadings from the OPPT Dust Study as a proxy for lead loadings in newer houses. Please comment on: 1) whether it is appropriate to adjust the lead loadings from the OPPT Dust Study downward based on the age (i.e., vintage) of the building for newer buildings, 2) a suggested approach for making the adjustment, if recommended, and 3) the application of such an adjustment for COFs in public or commercial buildings, as well as for residential buildings.

7. Adaptation of Approach for Exterior Renovation, Repair, and Painting

The examples provided in the Approach are for interior renovation jobs. The proposed rule also addresses exterior renovation, repair, and painting. When the Approach is used to build the houses for the economics analysis, exterior jobs will be represented. Modifications or enhancements may be needed to the approach to account for lead exposure from exterior jobs. In particular, lead dust created by exterior jobs may be tracked into a housing unit or COF or otherwise enter the unit or COF, and contribute to the indoor dust loading. Please comment on: 1) the extent to which the approach should consider this "tracked in" dust contribution to the indoor dust loading of a single property, and provide suggestions for incorporating it, if recommended; and 2) how to estimate potential lead exposures to occupants of neighboring dwellings from exterior renovations and for occupants of neighboring units in multi-family housing from interior renovations.

8. Adaptation of Approach for Other Contributions

The Approach was developed to consider the range of permutations and combinations of exposure scenarios and houses/COFs that would need to be built for this rulemaking. Please comment on whether any potential exposure scenarios and/or housing/COF considerations have been overlooked and should be considered when building the houses for this rulemaking. Please comment on any additional issues with building houses in which many low or high dust generating activities are used (e.g., small repairs or power sanding).

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