Center for Health, Environment & Justice (CHEJ)
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Lisa Jackson
EPA Administrator
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460 November 19, 2009

Dear EPA Administrator Jackson:

We thank you for the attention EPA has given to the Dioxin Reassessment over the past year. As you know, CHEJ feels that the Dioxin Reassessment document is extremely important to the health of the American people and we applaud your efforts to bring this long delayed process to closure. Today we are writing in regards to the updated Dioxin Soil Cleanup Levels that EPA is developing and will be releasing by December 31st, 2009.

We respectfully submit the following comments and recommendations for EPA to consider in developing these cleanup levels. **We strongly encourage EPA to establish an enforceable cleanup standard for Dioxins in soil that is no higher than the "background" level found throughout the U.S., as described below, and that is consistent with the lowest cleanup value of any state which is 3.9 parts per trillion (ppt) in soil.**

"Background" levels should reflect true background, and we define it as the EPA did in the 1987 National Dioxin Study as "as an area where you would not expect to find any dioxin."

The comments and information below provide the basis and support for this recommendation. We believe the EPA must strongly consider and incorporate these factors into the development of an enforceable soil cleanup level for Dioxins.

- A number of states have set soil cleanup standards or guidelines for Dioxin that are less than 10 parts per trillion (ppt), as shown below, including California at 4.6 ppt and Oregon at 4.5 ppt.

    - Florida 7.0 ppt TEQ[1]
    - California 4.6 ppt TCDD[2]
    - Oregon 4.5 ppt TCDD[3]
    - Delaware 4.0 ppt TCDD[4]
    - Idaho 3.9 ppt TCDD[5]
    - West Virginia 3.9 ppt TCDD[6]

- In the most recent draft of the Dioxin Reassessment, the mean background value for Dioxins in soil is 2.7 ppt of Total Dioxin Equivalents (TEQ) for rural area and 9.3 ppt TEQ for urban areas.[7] These estimates are summarized in Volume 2, Table 3-15 of the reassessment document.

- In the past, the USEPA has estimated the background level for dioxin in soil to be 8 ppt TEQ. This estimate was made in the 1994 draft reassessment document and is based on 95 samples "selected as representing background conditions in the United States."[8] EPA did not, however, define or identify the specific locations of the samples they used to derive this background estimate. CHEJ prepared a memo in 1998 that reviewed the actual studies and the individual data cited by EPA, and concluded that EPA's estimate of "background" Dioxin in soil "included data from testing conducted in urban and industrial areas where there are known dioxin sources." This memo is attached to this letter.

- Although EPA did not define background in the 1994 reassessment document, the agency used the term to indicate levels of Dioxin currently found in soil and defined as "representative." A reasonable definition of background can be found in the 1987 National Dioxin Study where background is defined as "an area where you would not expect to find any dioxin."[9] However background is defined, estimates should not include test results from Dioxin-impacted communities, such as Midland, MI or Lake Charles, LA. The most recent draft of the Dioxin Reassessment defines background as "the level of dioxin-like compounds in samples of environmental media originating from sites not known to be impacted by point source releases. However, the sources cited by EPA in the 1994 draft document were also included in the most recent (2003) draft.

- The National Dioxin Study found an average mean value of 2.83 ppt of 2378-TCDD in 17 of 221 urban soil samples. When non-detect values are included (204 of 221 samples), the average mean dioxin soil level is less than 1 ppt. Only 1 positive Dioxin value was found in 138 samples taken in rural soil with an average mean value of less than 0.5 ppt 2378-TCDD (the limit of detection used on the sampling).[10] These data are briefly discussed by EPA in the 2003 draft report, but they were not included in the derivation of the mean background soil values for either rural or urban areas.

- Based on CHEJ's analysis of the EPA's 1994 estimate of "background," which found that EPA included data from communities with known Dioxin sources, we are concerned that the 1994 **national background estimate of 8 ppt is likely to be high**. CHEJ remains concerned that the **background estimates for urban and rural areas in the 2003 draft document are also high** since all of the studies used in the 1994 draft are used again in the 2003 draft in addition to a number of newer studies.

- CHEJ continues to believe that the true estimate of "background" Dioxin in soil – collected from areas where you would not expect to find any Dioxin - is likely to be less than 1 ppt. The 2003 background estimate of 2.7 ppt TEQ for rural areas is closer to this true background estimate. The 2003 background estimate of 9.3 ppt TEQ for urban areas is not since it does include data from areas with known sources of Dioxins. Testing from areas with known sources of Dioxins should not be included in a national estimate of background Dioxin levels in soil whether for rural or urban areas.

- The final cleanup level for Dioxin should be established as a standard so it will be consistently applied at sites across the country. It is important that EPA establish an enforceable soil cleanup standard as opposed to a "guidance" value or a "remedial goal." If only a soil cleanup level guidance is set then EPA, state and local agencies, and responsible parties can chose to ignore the cleanup guidance claiming site-specific or other mitigating factors and allow for higher levels of Dioxin to remain on site.

- Dioxin's persistence in soil and long half-life is an important factor. On surface soil, it may take from 9 to 15 years to degrade half of the dioxin in the top 0.1 centimeters (cm) and 25 to 100 years to degrade half the dioxin in the subsurface soil below 0.1 cm.[11] In Times Beach, Missouri, it took 16 months before half of the Dioxin in the top eight of an inch of contaminated soil was photodegraded. Dioxin below that level did not wash out with rain, nor did it evaporate.[12]

- In developing EPA dioxin clean-up goals, the EPA needs to recognize that Americans are primarily exposed to Dioxin from the food we eat, in addition to other sources. Exposure to Dioxin through soil does not take place in isolation -- we are already being exposed to potentially harmful levels of Dioxin from our food consumption. The EPA needs to consider the cumulative effects of such exposure in developing clean-up goals.

- The fact that current body burden levels of Dioxin in Americans are at or near levels known to cause harm according to the EPA's own Dioxin Reassessment needs to be taken into consideration. Dioxin's endocrine disrupting, immune, developmental, and reproductive effects at extremely low doses are well documented in the latest draft of the Dioxin Reassessment.

- Standards should be protective of children, taking into account children's unique vulnerability to Dioxins and their soil hand-to-mouth ingestion behaviors. Developing children are uniquely vulnerable to the toxic effects of chemicals due to an increased susceptibility and an increased risk of exposure; children's metabolic pathways, especially in the first months after birth, are immature; their ability to metabolize, detoxify, and excrete many toxicants differs from that of adults; they are less well able to deal with a number of chemical toxins such as lead and organophosphate pesticides.[13] Information about this increased susceptibility has been acknowledged by the US Environmental Protection Agency, which now requires the addition of a ten-fold safety factor beyond other adjustments when setting standards for carcinogens.

- Standards should be based on protective assumptions about the magnitude of exposure from particular routes to adequately protect children. Because young children's breathing zones are so much closer to the ground, their exposure to contaminated soil via inhalation is more likely. Children can be exposed to relatively large quantities of chemicals through normal developmentally appropriate pica behavior – the intentional ingestion of non-food items. Pica is estimated to occur in about half of children ages one to three. Although a well known phenomenon, pica has not been well studied. That said, the technical consultants at Mount Sinai School of Medicine found that "an adequate body of scientific knowledge does exist on which to base an assessment of the approach to the acute ingestion of large amounts of soil and their potential for toxicity."[14] The range of ingestions reported by Calabrese et al. in 1997 was 25-60 grams for a single event.[15] Moya et al. published an article after the EPA's Exposure Factors Handbook was released that found children's soil ingestion ranged from 39 to 271 mg/day with an average soil and dust ingestion of 193 mg/day, with upper percentile values of ingestion of 104 to 1432 mg/day and an average soil and dust ingestion of 790 mg/day.[16] EPA should use the more protective assumption of the average upper percentile soil ingestion rate of 790 mg/day. Using an upper percentile value will protect most children, while using an average soil ingestion to develop the soil standard would protect only about half the children. If the average of 193 mg/day is used then those children with elevated soil-eating behaviors—who are likely to be those who

face the greatest health risk (the very young or those with existing developmental challenges)—will be exposed to unacceptably high levels of Dioxins.

- Standards should be established to protect sensitive and overburdened populations. This is especially important in light of the growing body of scientific evidence that lower levels of exposure, particularly for children, can have greater health effects across one's lifetime than previously known.[17] Additional studies underscore why it is important to specifically protect sensitive or overly exposed populations like subsistence fishers, tribal people, and those living in highly-contaminated urban areas.[18]

- Standards should be established with a target risk of residual contamination, which shall not exceed an excess cancer risk of one in one million for carcinogenic end points and a hazard index of one for non-cancer end points. EPA has a Superfund remedial goal that includes a one-in-a-million risk value and some states, such as New York, have specific statutory or regulatory requirements to use a one-in-a-million risk value.[19]

- Standards should be established to protect ecological resources, including groundwater, drinking water, surface water, fish and wildlife. Many states have established soil cleanup standards that are ecosystem protective to ensure residual contamination will not cause further harm by contaminating drinking water supplies or fish. Examples include California,[20] Florida,[21] Massachusetts,[22] and New York.[23]

- Standards should be established that are based on preventive models of human exposure. Our overarching recommendation, therefore, is that EPA should set standards to use protective exposure assumptions—using 95th percentile levels at a minimum—rather than predictive assumptions that might use the 50th percentile, or "average citizen" approach. In many cases, such exposures are assumed to be at the average or 50th percentile level, which fails to protect the 50% of the population who are the most highly exposed, such as children and sensitive populations. Presumably, EPA's remedial goals to protect public health does not mean only half of the population will be protected. For instance, the standards should be set using the 95th percentile time spent outdoors, according to the Child-Specific Exposure Factors Handbook, which is eight hours a day, seven days a week.[24] In addition, we note the comments from a 2004 paper by EPA's Office of the Science Advisor titled Risk Assessment Principles and Practices,[25] which was prepared in response to an initiative by the Office of Management and Budget (OMB) to gather comments on risk assessment practices across the federal government. The EPA document provides unequivocal support for EPA's longstanding practice of utilizing "high-end" hazard and/or exposure level values – "around 90% and above." EPA rightly concludes that such practices are designed "to ensure an adequate margin of safety for most of the potentially exposed, susceptible population, or ecosystem"; that they are consistent with EPA's legislative mandates; that they result in risk estimates that are "expected to be on the high end of the range of risks but within the range of plausible outcomes;" and that they are consistent with the National Research Council's landmark discussion of conservatism in 1994.[26] They note that it should be weighted toward protection and cite language contained in the major federal environmental statutes as providing evidence of support for a conservative approach to risk assessment.[27] While the "gross overestimation" of risk, as EPA phrases it, should also be avoided, the goal of protecting public health and the environment mandates that it is better to err on the side of overestimation than on the side of underestimation.[28] As EPA concludes: "[C]onsistent with its mission, EPA risk assessments tend towards protecting public and environmental health by preferring an approach that does not underestimate

risk in the face of uncertainty and variability. In other words, EPA seeks to adequately protect public and environmental health by ensuring that risk is not likely to be underestimated."[29] We urge EPA to adopt this philosophy in establishing dioxin soil cleanup standards using a 95th percentile and above. Protecting against plausible, real-life risk scenarios or adopting conservative assumptions in the face of uncertainty will not result in the gross overestimation of risk. Adopting high-end toxicity values and exposure levels is a valid way to protect more sensitive and susceptible populations including children and environmental justice communities.

We strongly urge EPA to set an enforceable cleanup standard for Dioxins in soil that is no higher than the "background" level found throughout the U.S., as described above, that is consistent with the lowest value of any state which is 3.9 parts per trillion (ppt) in soil, and that follows a "no additional exposure" precautionary approach.

Thank you for your attention to this critical environmental health and justice issue.

Sincerely,

Lois Gibbs, Executive Director
Center for Health, Environment and Justice

Stephen U. Lester, Science Director
Center for Health, Environment & Justice

Enclosure: CHEJ Analysis of Background Levels of Dioxin in Soil

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