

28 May 2008

Dear Fred,

In response to your request here are my “Pre-Teleconference Comments” on the Proposed Lead NAAQS. These comments are based on the text of the notice in the Federal Register of May 20, 2008, responding to some of the specific questions raised.

On the issue ( page 29232, left column) of changing the indicator from the current TSP to the Pm10, I would support maintaining the current usage of TSP, which would include more of the coarser particles. I realize these coarser particles may not be respired directly, but they are available for uptake by other, well-understood pathways. These other pathways are not as efficient as direct inhalation. Even all the pathways combined may not equal respiratory intake. So, using these coarser particles would assigning an upper-limit or worst-case value for blood lead to a given airborne lead. This provides some part of the safety factor, which would be prudent given the magnitude of our uncertainties in predicting blood lead distributions for a given environmental load. So, about sampling, I am of the opinion that regulating the coarser particles is appropriate given current residential sources of lead and opportunities for exposure.

Regarding the usage of the 2nd worst month ( page 29234, right column, bottom ½), I would not support blaming unusual meteorology as a reason to “discount” a “bad month” every three years. I would expect that you can count on some “unusual meteorology” once every three years, and not be surprised by it, or find reason to “discount” it. If the term “discount” here suggests “eliminate” or “discard”, I would be troubled. Still, since the exposure was real, and harm might follow, why disregard it by censoring the data? Furthermore, why particularly by eliminating the highest ? Why not the eliminate the lowest for reason of some meteorological quirk?

About the various suggested timings of limits, I am guided by the view that lead is a cumulative poison. Whether in spikes or constant exposure, it is the total sum that reaches the target organs. So, in considering the different options, I would be swayed towards whichever one minimizes that total. Averaging times need be at least a month because of the response time of the blood lead pool. It may be more practical to use a longer time, such as a quarter, only three months.

Concerning setting a zero standard, I must respond, in the strong negative. No, not

for lead. Lead occurs naturally, unlike some synthetic chemicals. With sufficient analytical powers, traces of lead can be detected anywhere. Even the most pristine rocks and soils, fresh lava or moon rocks, all have about 10 mg/kg. Natural waters and air have much lower concentrations, parts per billion or trillion. Incidentally, this suggests, at least theoretically, a safe or no-effect range of lead exposure. Of course, we have learned from other elements (arsenic, selenium, mercury...) that naturally elevated levels, found where the element concentrations naturally, may be toxic. So too, perhaps for lead. Within the range of natural exposures, the highest levels might be toxic, but we are far above those natural levels today. I do not know what that no-effect range might be, but it certainly is not zero.

For an analytical chemist, detecting these low levels can be a challenge, but clearly do-able. Assigning a “zero” value to what is “not detectable” is not acceptable practice. So, a zero standard would put the whole earth, and everything in it, above that standard. A standard that could never be reached. Yippes. The standard needs to be set based on some health-based risk or danger of environmental damage, or based on some anomalous enrichment or “Clarke value”.

Hope some of this is useful.

Michael Rabinowitz, PhD  
Geochemist