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To: Fred Butterfield, Designated Federal Officer, Clean Air Scientific Advisory Committee (CASAC); Ted Russell, CASAC Ambient Air Monitoring and Methods (AAMM) Subcommittee Chair
From: Delbert J. Eatough, CASAC AAMM subcommittee member
Subject: Review of Ambient Monitoring Issues Related to Lead

1. Comments on Draft Federal Reference Method (FRM) for Lead in Pb-PM_{10}

What are your comments on the use of the low-volume PM_{l0c} FRM sampler as the Pb-PM_{10} FRM sampler?

I fully support the suggestion. The sampler is well characterized, available and compatible with other instruments in existing networks. For reasons stated in Section 2., I do not believe that basing the standard on a low volume TSP sampler is a good idea at this time.

What are your comments on the use of XRF as the Pb-PM_{10} FRM analysis method?

I am not an expert on XRF but concur with the points made by others that the establishment of ICP-MS as the FRM with XRF as a FEM is a reasonable direction to go. The reasons given for going this direction as discussed in the call included 1. Availability of the technique in many states. 2. Ease of extraction and sensitivity of analysis for the techniques. 3. Avoidance of the issues inherent with XRF if the deposit on the filter is not uniform.

What are your comments on the specific analysis & details of the XRF analysis method contained in the proposed Pb-PM_{10} FRM analysis method description?

Do you think the precision, bias and MDL of the XRF method for the proposed Pb range will be adequate?

Are there any method interferences that we have not considered?

As I am not an expert on XRF analysis, I defer to the comments made by members of the committee who are.

2. Comments on proposed Pb-TSP FEM.

Scientific Basis for Use of a Low Volume TSP Sampler for Pb.

I do not believe that the scientific evidence is in place to justify developing a new low volume TSP sampler and basing the standard on the use of that instrument. While

the arguments for the need to measure all PM Pb have been given by both members of the committee and in the EPA documents, I do not believe we have the evidence to base the standard on a, as yet, unknown method. The whole crux of the matter is how important Pb in particles larger than 10 microns is. The great bulk of the data suggest that PM_{10} measurements are completely adequate in most situations and that the fraction is lead in particles larger than 10 microns is of the order of 25% in most cases. I have earlier outlined my concerns about the use of the East Helena smelter study where a factor of 2 was seen and will repeat those comments here.

An examination of the document provided to the AAMM subcommittee by Fred Butterfield on April 8 suggests this is a very weak hat to hang the decision of developing a completely new Pb TSP measurement. I have the following serious concerns with the study:

1. The study does not carry the weight of a peer reviewed publication.
2. The samples were collected about ½ mile from the fence line of the ASARCO smelter. At this distance, one would expect to see some variation in the mix of <10 and >10 micron particles present as a function of wind direction and wind speed as the import of large particle fugitive dust versus small particle emissions impacts varies. In fact, this is not the case, but the study is amazingly consistent for all collected data.
3. One would also expect to see a variation in the fraction of the particles present as Pb as the above factors change the relative amount of various sources from the smelter. In fact, this fraction is constant (as well as the ratio of PM_{10} and TSP) for all data points.
4. No details are given on the filter media on which samples were collected, the methods of data analysis, blank corrections, etc.

In short, the study is not consistent with know and expected variations in large versus small particle concentrations and composition from a near-by smelter source. In addition, insufficient detail is given to determine whether this unexpected result is due to a most fortuitous combination of meteorological factors, or to a fundamental flaw in the study design and sample analysis. I therefore conclude that established something as important as the direction of the future Pb standard and the associated sampling protocol essentially on this study is unwise.

Based on the above, I strongly support moving to a Pb-PM_{10} protocol. Furthermore, I believe attempting to use factors in setting the standard would not be based on firm data. If it is believed that the TSP standard should be maintained, I would think the current sampling method should be used until additional data are available to justify a new sampler development. Neither cost nor the current science justifies it in my opinion.

There should be data available which would help to shed further light on this question. Several samplers (MOUDI, Battelle impactor, 8 stage rotating DRUM, etc.) have been used to measure particle size distribution of Pb in previously reported studies. Those results should be examined to see if they support the existence of a substantial

fraction of airborne Pb being present in particles larger than 10 microns. Alternatively, a study which can stand the light of peer review should be mounted to see if the results obtained in East Helena can be replicated near existing Pb smelter facilities, such as those near St. Louis. These efforts would prevent establishing a whole new sampler technology for FRM sampling which is not based on solid peer reviewed evidence.

Development of a Low Volume TSP Sampler for Pb.

A new low volume sampler for the FRM measurement of TSP Pb should not be deployed until it has been well characterized. While such samplers are currently available from manufactures, they have not been scientifically validated. The particle collection efficiency as a function of size and the effect of wind on this efficiency is not known. Until these data are available, we do not know to what extent the Low Volume sampler will provide better results than the current High Vol TSP.