Draft Comments Submitted by Jay R. Turner (March 25, 2008)

Attachment 1: Options for Lead NAAQS Indicator: Monitoring Implications

Charge Questions

- *Considering issues such as sampler performance, size cuts, operator maintenance, integration with other measurement systems, and usefulness as the measurement system for the indicator, please describe the advantages and disadvantages of sampling and analysis of Pb-TSP versus sampling and analysis of Pb-PM10.*
- *Is it appropriate to monitor for Pb-PM10 near Pb sources? And if so, under what conditions?*
- *One indicator option suggests using scaling Pb-PM10 monitoring data up to an equivalent Pb-TSP level in lieu of Pb-TSP monitoring data. Under what circumstances would it be appropriate to scale data (e.g., non-source oriented sites, low concentration sites) and when would it not be appropriate to scale data?*
- *We have limited data collocated Pb-PM10 and Pb-TSP monitoring data. What types and "scaling factors" are appropriate to create using this data (e.g., non-source oriented, source oriented)? What levels are appropriate for the types of scaling factors identified in the white paper?*

Comments

Clearly Pb-PM10 measurements would be more closely aligned with the current particle-related compliance monitoring network. That said, the issue is the extent to which the standard must/should be directly tethered to the properties responsible for adverse effects. Ideally the indicator would reflect the particle size range of concern. As noted in the memorandum, this is complicated for Pb because the routes of exposure include ingestion as well as inhalation, and thus larger particle sizes are also of interest. If Pb-TSP is most representative of the particle properties that should be regulated, then the indicator should reflect this size range either directly (e.g., a Pb-TSP standard) or indirectly using another indicator such as Pb-PM10 indicator which could be used in combination with a conservative adjustment to the Pb-TSP threshold value to arrive at a standard. Note in this case the application of an adjustment would take place in setting the standard (indicator and threshold value) rather than in the implementation of the standard (using Pb-PM10 with scaling factors to assess compliance with the Pb-TSP standard).

Role of Pb-PM10 measurements if the indicator is Pb-TSP. Sites with Pb-PM10 greater than the threshold value for the Pb-TSP indicator clearly violate the standard. Thus, Pb-PM10 could be used as a screening tool to identify areas of violation with subsequent compliance measurements using a suitable FRM or FEM technology. The gray zone would be areas that with Pb-PM10 less than the threshold value for the Pb-TSP indicator. In this case, perhaps very conservative scaling factors (perhaps even more so than the values highlighted in the memorandum) could be used to assess the likelihood of noncompliance and trigger the deployment of FRM/FEM measurements.

Development of Scaling Factors. This is an interesting approach and more information would be helpful in assessing the potential application of scaling factors. Concerning the analysis presented in the memorandum, the regression suggests negligible increase in Pb-TSP compared to Pb-PM10 for the non source-oriented sites. Was this an ordinary least squares regression (OLS)? If so, do the regression coefficients significantly change if a Deming-type regression is used? A footnote states the "original regression gave a negative zero intercept"; the question is whether the intercept is statistically distinguishable from the origin and this can be determined from the regression coefficients confidence intervals. Indeed, it would help to have 95% confidence levels on the regression coefficients. While there were 31 sites, virtually all of the concentration values are below 0.05 $\mu g/m^3$. How many of the high concentration values (e.g., greater than 0.1 $\mu g/m^3$) came from a single site? This would clarify whether the regression is being strongly influenced by a single site. The data representation in Figure 1 is visually misleading since axis ranges are similar but the plot has a high aspect ratio; the figure should be remade as a square with identical axis range (e.g., 0-0.3 $\mu g/m^3$). This will provide a better visual representation of the relatively high Pb-TSP values observed at relatively low Pb-PM10 values. For the source-oriented analysis with only two sources, is the data above 0.5 $\mu g/m^3$ from a single source?

Attachment 2: Draft Federal Reference Method (FRM) and Federal Equivalent Method (FEM) Criteria for Lead in PM10 (Pb-PM10)

Charge Questions

- Is it appropriate to use the low-volume PM10c FRM sampler as the Pb-PM10 FRM sampler?
- What other PM10 samplers should be considered as either FRM or FEM for the Pb-PM10 FRM?
- Is XRF an appropriate Pb-PM10 FRM analysis method?
- What other analysis methods should be considered for FRM or FEM for the Pb-PM10 FRM?
- Have we selected appropriate precision, bias, and method detection limit requirements for FEM evaluation?

Comments

If a Pb-PM10 indicator is selected, the low-volume PM10c sampler should be a suitable Pb-PM10 FRM sampler if the threshold value is sufficiently high to permit adequate data quality with analysis by XRF. Using the lowest reported candidate NAAQS level in Table 3 of Attachment 3 (0.02 $\mu g/m^3$) and a 4:1 scaling factor for Pb-TSP compared to Pb-PM10 (conservatively high for the source-oriented scaling factors in Attachment 1), the standard would be about 5 times the estimated XRF MDL (Table 1). Thus, as long as the NAAQS level is in the upper portion of the candidate range (0.02 – 1.5 $\mu g/m^3$) the combination of a low-volume PMc sampler and analysis by XRF should be adequate.

XRF does not require sample digestion. Should other analysis methods be considered FEM designation, it will be important that the specifics of the extraction protocol be part of the method. Prior intercomparison studies have clearly demonstrated that equivalency can be achieved for Pb between XRF and ICP-MS, but such findings might be limited to certain extraction methods.

Attachment 3: Lead NAAQS Ambient Air Monitoring Network: Network Design Options Under Consideration

Charge Questions

- What types of monitoring sites should be emphasized in the network design (e.g., source oriented monitors, population monitors, near roadway monitors)?
- We are considering proposing requirements for monitoring near sources exceeding an emissions threshold and discuss a number of options for determining this threshold in the white paper. What options should be considered in establishing an emissions threshold?
- We are considering proposing requirements for non-source oriented monitoring in large urban areas to provide additional information on ambient air concentrations in urban areas.
- Considering other monitoring priorities and a potential requirement for Pb monitoring near sources, what size of a non-source oriented Pb network is appropriate?
- What factors should we base non-source oriented monitoring requirements on (e.g., population, design value)?
- We are considering proposing requirements for Pb monitoring near roadways and interstates. Is it appropriate to include separate monitoring requirements for near roadway monitoring, or should near roadway monitors be a part of the non-source oriented monitoring requirement?
- Under what conditions would it be appropriate to waive the monitoring requirements for either source or non-source oriented monitors?

Comments

Emphasis should be placed on population monitoring and source oriented monitoring. In the latter case, it is important to consider historical industrial activities and not rely solely on contemporary emission inventories. For example, in East St. Louis is appears that a significant source of Pb-PM10 is from resuspension of Pb that was deposited from smelting activities that took place over the past decades. The Pb sources include not only the currently operating Pb smelter in Herculaneum but also other Pb smelters that previously operated in the Metro east area but have been shuttered for decades. Indeed, resuspension of historically-deposited Pb from prior smelting operations might partially explain the high ratio of ambient Pb to NEI emissions for AQS ID #171190010 in Granite City, IL (Table 2).

Concerning the analysis of near roadway emissions, it is noted that AQS ID#291892003 in Clayton, MO (Table 7) is located in metropolitan St. Louis and is likely impacted by plumes from the Herculaneum Pb smelter and potentially the aforementioned resuspension issue (although this site is somewhat more removed from the zone of historical smelting activity which was concentrated in the Metro East area).

Attachment 4: Lead NAAQS Ambient Air Monitoring Network: Sampling Frequency Options Under Consideration

Charge Questions

- What sampling frequency would be appropriate if the Pb NAAQS is based on a monthly average?
- Is it appropriate to relax the sampling frequency in areas of low Pb concentration? If so, at what percent of the Pb NAAQS?
- Is it appropriate to relax the sampling frequency in areas considerably higher than the NAAQS? lf so, at what percent of the Pb NAAQS?

Comments

It is likely that 1-in-3 day or higher frequency would be needed to obtain a stable monthly average values. Given that the Pb will often be associated with the coarse PM fraction and the sensitivity of coarse PM to environmental conditions, sampling frequencies greater than 1-in-6 days will most certainly be needed in most cases.

Any thoughts on how concentration values below MDL would be imputed?