**Dirk Felton: CASAC AAMM Individual Written Comments on Ambient Air Monitoring Options for Lead**

(Prepared for the March 25th teleconference
Revised March 27th)

**These comments have been made in spite of the broad range proposed for the primary and secondary Pb NAAQS. The level of the standard drives much of the network design, sampler technical specifications and analytical methods. More specific comments can be offered if the range for the standard is narrowed.**

**Part of the discussion during the teleconference centered around the desire to know the size of the Pb containing particles in ambient air. The NYSDEC has some Pb size data available from a PMcoarse evaluation that was performed in 2005. Samples were collected through calendar year 2005 on the EPA 1 in 6 day schedule. Filters were analyzed by XRF from low volume $PM_{10}$ and $PM_{2.5}$ samplers in New York City and Niagara Falls, NY. The data for Pb is displayed in table 1 as ratios of $PM_{10}$ / PMcoarse.**

Table 1

| NYC | All Data | Cold Months | Warm Months |
|---|---|---|---|
| mean | 0.47 | 0.41 | 0.53 |
| median | 0.47 | 0.43 | 0.61 |
| 25%ile | 0.29 | 0.23 | 0.33 |
| 75%ile | 0.66 | 0.61 | 0.71 |
| min | 0.00 | 0.00 | 0.00 |
| max | 1.00 | 0.93 | 1.00 |

| Nia Falls | All Data | Cold Months | Warm Months |
|---|---|---|---|
| mean | 0.31 | 0.27 | 0.34 |
| median | 0.27 | 0.29 | 0.24 |
| 25%ile | 0.08 | 0.06 | 0.12 |
| 75%ile | 0.47 | 0.46 | 0.53 |
| min | 0.00 | 0.00 | 0.00 |
| max | 1.00 | 0.58 | 1.00 |

**The data shows that for the Pb containing particles smaller than PM10, slightly more Pb is found in the $PM_{2.5}$ fraction than in the PMc fraction at these locations in New York.**

**A presentation on the NYSDEC PMc evaluation was delivered at the 2006 National Monitoring Conference. The ppt file can be found on the EPA AMTIC webpage:**
http://www.epa.gov/ttn/amtic/files/ambient/2006conference/felton.pdf

• **<u>Attachment 1 *Options for Lead NAAQS Indicator: Monitoring Implications*</u>**

**Charge Questions:**

*1. 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-$PM_{10}$.*

**The primary advantage of implementing the $PM_{10}$ size cut for the Pb standard is that the resulting data is more relevant for air pollution related health effect correlation and for source permitting and source control.**

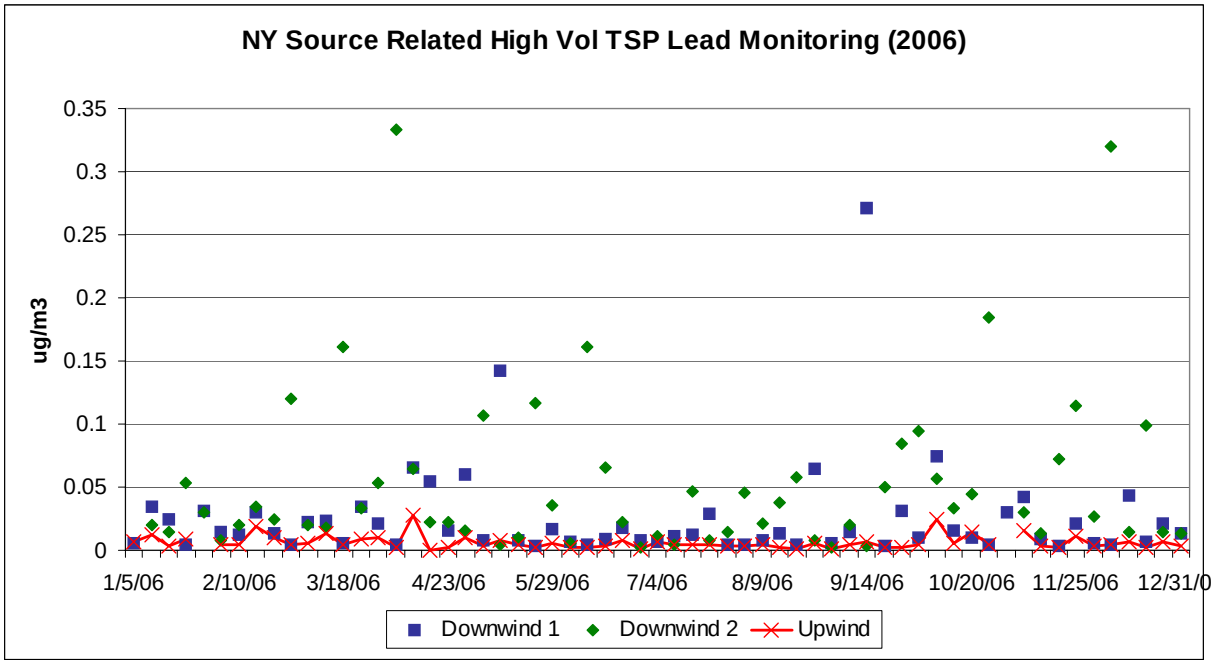
*2. Is it appropriate to monitor for Pb-$PM_{10}$ near Pb sources? And if so, under what conditions?*

**It depends on the type of source. TSP is still the best choice for monitoring on-site and at the perimeter of large fugitive Pb sources. This would include primary smelters and other smaller sources where significant outdoor raw material handling is performed. It is acceptable to use $PM_{10}$ monitors at middle or neighborhood scale population exposure locations adjacent to source properties. The data from the $PM_{10}$ monitors is more consistent because in locations downwind of Pb sources, the data will be relatively unaffected by deposition losses. This makes the interpretation of data simpler because varying downwind concentrations can be more easily related to sources.**

*3. One indicator option suggests using scaling Pb-$PM_{10}$ 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?*

**Scaling $PM_{10}$ data is not necessary. Sites that are distant from sources of Pb are not going to be significantly impacted by particles larger than $PM_{10}$. One way to determine if a monitoring location is likely to be impacted by large particles is to review the historical variation of the Pb TSP data. Since concentrations of large particles vary tremendously due to source variations such as work shift changes, material handling changes, deposition, and meteorology; datasets that exhibit little concentration variation are not likely to be impacted by large particles.**
**(See the upwind site data in Figure1)**

(Figure 1)




• **<u>Attachment 2 *Draft Federal Reference Method (FRM) and Federal Equivalent Method (FEM) Criteria for Lead in PM10 (Pb-$PM_{10}$)*</u>**

**Charge Questions:**

*1. Is it appropriate to use the low-volume $PM_{10c}$ FRM sampler as the Pb-$PM_{10}$ FRM sampler?*

**Yes, the sampler is well characterized and very familiar to State and Local air monitoring Agencies. The sequential versions of the samplers should also be designated as FRMs because future Pb $PM_{10}$ FEM evaluations should use the FRM samplers and protocols most predominantly utilized in the National network. Future FEM evaluations should be designed with the identical sample collection interval (midnight to midnight) and filter handling procedures as followed by the majority of the data providers for the national network.**

*2. What other $PM_{10}$ samplers should be considered as either FRM or FEM for the Pb-$PM_{10}$ FRM?*

**Monitoring Agencies should be permitted to use High Volume TSP and existing High Volume FRM and FEM $PM_{10}$ samplers if the data is approximately adjusted for Local Conditions and the data from the site is well below the ambient Pb standard (< 70% of the NAAQS). If TSP samplers are used, the resulting Pb concentrations should be compared to a new Pb-$PM_{10}$ standard. High Volume**

**samplers would have to be considered FEMs.**

*3. Is XRF an appropriate Pb-$PM_{10}$ FRM analysis method?*

**Specifying XRF would make analytical problems stemming from non-uniform loading and non-ideal filter loading densities an inherent part of the FRM. ICPMS should be the analysis method for the FRM and for the PEP audit samples. ICPMS is more accurate and it does not require the filter to be uniformly loaded. XRF should be designated as a cost effective FEM that is routinely compared to ICPMS through the periodic collocation of the PEP audit program.**

*4. What other analysis methods should be considered for FRM or FEM for the Pb-$PM_{10}$ FRM?*

**XRF and GFAA should be considered for FEM designation.**

*5. Have we selected appropriate precision, bias, and method detection limit requirements for FEM evaluation?*

**The precision requirement should be tightened to 10% for new methods with a provision for 15% to permit FEM designation for existing high volume samplers.**

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

**Charge Questions:**

*1. What types of monitoring sites should be emphasized in the network design (e.g., source oriented monitors, population monitors, near roadway monitors)?*

**Source oriented monitoring should be emphasized.**

*2. 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?*

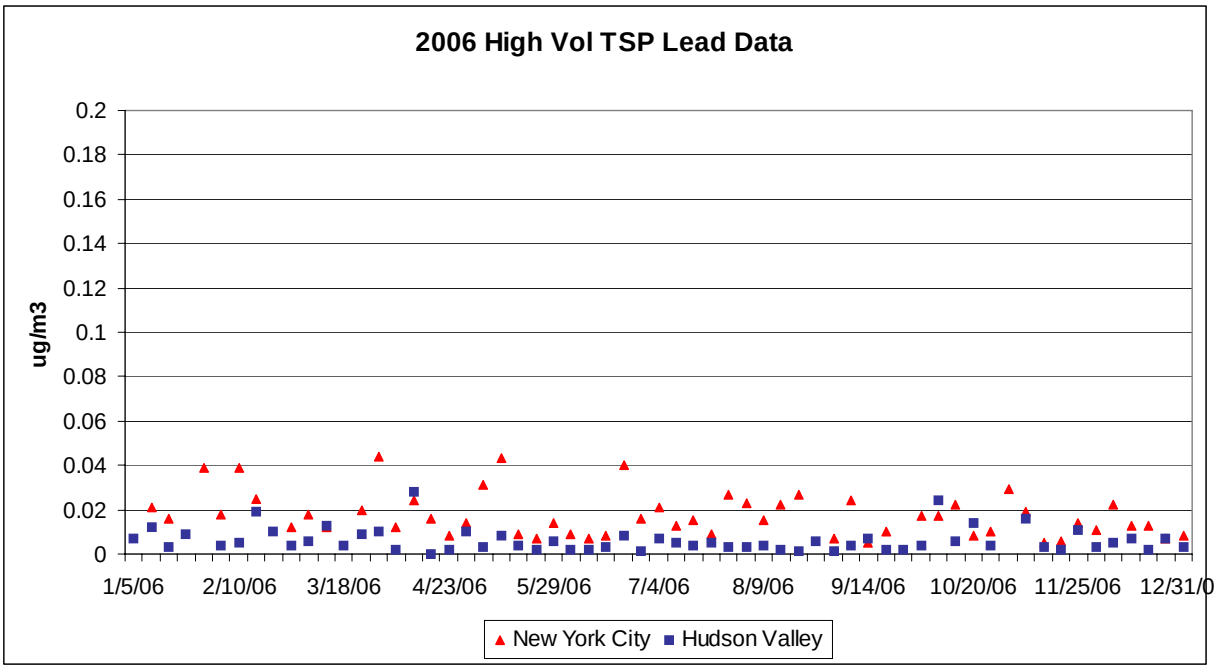
**The analyses described in the white paper look at the amount of Pb emitted from a facility but there is no consideration of the type of emissions. Sources that handle large quantities of raw materials such as smelters and battery recyclers are likely to emit large plumes periodically. These sources will need downwind monitoring at a lower threshold than a source such as a ceramic manufacturer or a municipal incinerator that has a more consistent process output. The emissions threshold should be a range that provides for more intensive monitoring for sources that have relatively high Pb emissions or for sources that have the ability to release high concentrations of Pb if a process control were to malfunction.**

*3. 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?*

**Urban areas are likely to show a small increment to the background Pb concentrations associated with known sources. Since these increments are not significant at all but the lowest concentrations under consideration for the revised NAAQS, non-source oriented monitoring should not be emphasized in urban areas distant from Pb sources. Historic Pb data and current data from the NATTs network locations can be used to determine if urban areas are close enough to a source to warrant ambient monitoring. Figure 2 shows the Pb concentrations for an urban location in New York City and a regional site in the Hudson Valley.**

(Figure 2)




*4. What factors should we base non-source oriented monitoring requirements on (e.g., population, design value) ?*

**Population size is not well correlated with ambient Pb concentration and should not be used as a factor in Pb ambient monitoring network design. The design value is acceptable if one can be calculated from historical data or from data collected by other monitoring programs such as NATTs.**

**Urban areas are also sometimes located near known sources of Pb. In these cases, population exposure monitors are warranted in order to obtain a reasonable design**

**value for the urban/populated area. These evaluation monitors should be easily discontinued if they demonstrate that the newly calculated design value is below 35% of the NAAQS.**

*5. 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?*

**Near roadway monitors will only be necessary if the NAAQS is chosen at the lowest of the levels currently under consideration. If the Pb NAAQS is set at a very low level, near roadway monitors should be considered source monitors. This may aid in the development of emission factors for specific roadway attributes such as age, vehicle miles traveled and the ratio of heavy duty diesels to passenger cars.**

*6. Under what conditions would it be appropriate to waive the monitoring requirements for either source or non-source oriented monitors?*

**Source oriented monitoring could be waived if the source conducts routine supervised representative Pb monitoring and that monitoring data shows no short term concentration spikes and no incremental differences in the downwind Pb concentration.**

**Required non-source oriented monitors should be waived if the design value is below 35% of the NAAQS and there are no changes in the inventory of potentially significant sources. The non-source oriented sites that have design values below 70% of the NAAQS should be permitted to reduce their monitoring frequency to 50% of the required sampling frequency.**

**Single monitors can be assigned for non-source oriented population exposure monitoring as long as the design value is below 70% of the NAAQS. If the design value of the MSA/CBSA is greater than 70% of the NAAQS, multiple monitors may be required in order to accurately determine the possible extent of a non-attainment area.**

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

**Charge Questions:**

*1. What sampling frequency would be appropriate if the Pb NAAQS is based on a monthly average?*

**One day in three represents a reasonable compromise between necessary accuracy and the effort and costs required to perform frequent filter based sample collection and chemical analysis.**

*2. Is it appropriate to relax the sampling frequency in areas of low Pb concentration? If so, at what percent of the Pb NAAQS?*

**Yes, the sampling frequency should be reduced by 50% when the design value is below 70% of the NAAQS. The sampling frequency should also be reduced when the ambient data is very consistent from sample to sample. This could be instituted by specifying a threshold coefficient of variation below which the sampling frequency could be reduced. The sampling frequency should not be reduced for sites near large sources.**

*3. Is it appropriate to relax the sampling frequency in areas considerably higher than the NAAQS? lf so, at what percent of the Pb NAAQS?*

**No, Pb concentration data from areas above the NAAQS are necessary to adequately determine the potential health effects from specific Pb sources.**