

## MEMORANDUM

Date: August 2, 2010

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Dr. William J. Rogers – Tennessee Valley Authority

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Subject: Increased Method Detection Limits for Air Particulate Matter Metals Analyses

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As part of ambient air monitoring performed in association with the Tennessee Valley Authority (TVA) Kingston Ash Recovery Project, filters are submitted to a fixed-based analytical laboratory for metals analysis in accordance with US EPA Method IO-3.5 (modified for ICP/MS analysis). During 2010, filters for metals analysis were submitted to Bureau Veritas, Inc. (BV) in Novi, Michigan, until April 14, 2010. Beginning with the April 14, 2010, run date, filters for metals analysis were submitted to Inter-Mountain Laboratories, Inc. (IML) in Sheridan, Wyoming.

A review of the method detection limits (MDLs) and reporting limits (RLs) reported by BV and IML revealed significant differences in the limits to which each laboratory reports. The MDLs and RLs reported by BV for all requested metals were significantly lower than those reported by IML. Based on discussions with each laboratory, the Environmental Standards/TVA QA Team identified differences between the methods used to demonstrate instrument sensitivity – differences that resulted in the observed discrepancies between their reported MDLs and RLs.

BV performs MDL studies using a fortified aqueous matrix as described in US EPA Method IO-3.5 (Section 11.2.2). The MDLs generated from the aqueous MDL study are subjected to a multiplier (~3 – 5 times) to determine the analyte RLs. These aqueous MDLs and RLs are then converted to filter units for reporting filter-based data. The MDLs prepared using an aqueous matrix take into account instrument variability but do not evaluate the impact of the composition of the filter media on the analytical results.

IML performs MDL studies using a fortified aqueous matrix as described in US EPA Method IO-3.5. For TVA samples, however, IML performed an additional MDL study using air filters from the specific lots that were provided to TVA for sampling. The filter-based MDLs are then subjected to a multiplier (~3 – 5 times) to determine the analyte RLs. In addition to accounting for instrument performance, the filter-based MDLs also account for the composition of the filter matrix; therefore, higher (and more realistic) variability within the study is expected. The increased variability within the filter-based MDL study results in higher calculated MDLs and RLs.

The use of aqueous standards in MDL studies is consistent with requirements described in the requested method; however, MDLs derived by this method do not take into account the impact of filter composition on the analytical results. IML and the TVA/Environmental Standards QA Team, therefore, believe that the filter-based MDL determination performed by IML provides a more realistic indication of day-to-day method sensitivity for field samples collected using a similar collection media.

Environmental Standards recommends that TVA include the following statement on its website to clarify the differences in MDLs and RLs to those viewing the data:

*Effective April 14, 2010, the fixed-based analytical laboratory performing metals analysis on air filters changed; accordingly, the sample reporting limits were updated. The current analytical laboratory uses a more realistic method for determining analytical sensitivity that results in higher reporting limits compared to the previous laboratory.*

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End of Memorandum.

