Summary of response to reviews

There were no major changes to the conclusions or text. The following issues were addressed:

1. I could find no difference in the original Solderholm equation for respirable dust and the ISO convention as described in the book Aerosol Measurement and the 2000 ACGIH TLV booklet.

2. The subject of Lithium Ion battery safety issues has been raised and addressed through redundant safety design by Thermo and through review and testing by MSHA. While Li-Ion fires and explosions are reported in the press with cell phones and to a lesser extent with laptop computers the more rigorous intrinsic safety circuitry with redundant fail-safe design, combined with thermal sensors, and fuses are believed to have solved these questions for the PDM.

3. I have expanded the description of the momentum compensator, however, the details of the design are proprietary and the patent was listed for reference.

4. Dust generated for the Marple chamber was charged neutralized with a TSI model 3012 - KR 85 radioactive source operated within the manufactures recommended life time for the source (10 years). Dust in the chamber was not checked for neutrality. The reference in the paper to the Marple chamber contains test results regarding chamber uniformity. (Typical sampler rsd's better than 0.05.) Airflow rate through the chamber was 2-300 cfm depending on aerosol concentration with a maximum sampler drawing rate of 79 lpm. This information will be added to the methods section.

5. You are correct, no inversion routine was used.

6. The values of a MMAD of 3.91 μm for pre and 4.01 μm are well within our experimental error. I will indicate in the text that this is the average size for triplicate measurements with a relative standard deviation of 0.007 and 0.079 respectively.

7. Unfortunately we did not independently verify the K0 value upon receipt, however, this was recorded by Thermo Electron and based upon their comments on the manuscript this discussion will be expanded to include additional information.

8. There are many personal dust monitors and the PDM acronym has been used by many companies. A quick Google search for (PDM aerosol monitor) locates the MIE light scattering monitor, the R&P tapered element monitor, a "Portable Dust Monitor" by HAM in Knoxville, TN, as well as the Grimm 1108 monitor. The acronym has been associated with this development for the last 6 years and would be difficult to change at this point. Results of a Google search for "PDM" turn up lots of references to this instrument. The final commercial designation will be up to the manufacturer.

9. This work is to be published as a CDC numbered series document for the purposes of the official record of results of the project. Unlike journal publications, the use of more extensive

data presentation in the body of the report is acceptable. More extensive tables are listed as appendices. As a detailed record of the work some readers may find interest in corresponding individual PDM#'s with various other parts of the report. We do in fact make reference in the text to specific PDM results in some of the tables and the designation of PDM # is warranted.

10. This is a good suggestion and we will add the definitions of accuracy, bias and precision as described by Kennedy et al. to the body of this report. Emphasis of the accuracy results will be added to the beginning of the Results section and the discussion of bias and precision will be moved up in the Discussion section.

11. This will be done as described in 3. In addition, bias in the results section will be clarified.

12. The PDM is not a true real-time dust monitor, however, is a continuous measuring monitor and we will work that concept into the title.

13. The word "Lamp" in "Cap Lamp" was inadvertently cut off in the figure and has been restored.

14. Mathematically the cumulative mass concentration is the mass divided by volume to this point in the sample time. If the miner moves out of the dust, and no further mass accumulates and volume increases (as sampling time continues) cumulative mass concentration will decline.

15. Miners refer to the battery, cord and lamp as their "cap lamp." The PDM is a part of all three of these elements and thus is integral to the miner cap lamp.

16. The cyclic variations we refer to are short, and of small magnitude, but for very accurate mass determinations do have an impact on the mass measurement. It is physically impossible to weigh two filters on the same balance at the same time, so to say "should have" is impossible.