



MEMORANDUM

To: Gerald Kennedy

From: Michael DeLorme

Date: 19 June 2002

Subject: APFO Aerosol Generation and Particle Size [REDACTED]

Introduction

Inhalation toxicology studies with APFO in rats conducted by Haskell in 1980 demonstrated biological correlations between the airborne concentration of APFO and toxicological responses in exposed rats. The 1980 study was conducted at 3 exposure concentrations (1, 8, and 80 mg/m³ APFO). However, air sampling techniques employed at that time did not clearly identify the size distribution of the APFO particles in the atmosphere. We conducted the following experiment to determine the airborne size distribution of APFO, using as best as possible, the generating conditions used in the 1980 experiment.

Test Material

APFO (Ammonium Perfluorooctanoate) supplied by 3M.

Atmosphere Generation Procedure

Atmospheres were generated by suspension of APFO in air with a Model 00 Jet-O-Mizer jetmill. APFO was metered into the jetmill with a twin-screw volumetric feeder where it was carried with high-pressure air through a glass cyclone elutriator and an exposure chamber.

Air Sampling Analysis

The atmospheric concentration of APFO was determined by gravimetric analysis where a measured volume of chamber atmosphere was drawn from the chamber sample port, through a 25mm filter cassette containing a pre-weighed Gelman glass fiber filter (Type A/E). Filters were weighed on a Cahn Microbalance.

Particle size distribution was determined with a Sierra[®] Series 210 Cyclone Preseparator/Cascade Impactor and Sierra[®] Series 110 Constant Flow Air Sampling pump.

Air Sampling Results

Chamber Concentration: $397.7 \pm 20.8 \text{ mg/m}^3$ APFO (mean $\pm$ SD)
Particle Size: $2.6 \mu\text{m} \pm 2.17$ (MMAD $\pm$ GSD)

Conclusion

The geometric standard deviation (GSD) of 2.17 indicates a size distribution that is typical of these types of atmosphere generating systems and suggests a reasonably homogenous atmosphere. Unlike the 1980 study, the current experiment utilized a direct gravimetric method for the particle size distribution determination. The APFO concentration observed in the current study is higher than those used in the 1980 study because of the large amount of set-up time currently required to achieve stable, low level atmospheres at Haskell. However, the GSD would not be expected to change significantly at lower concentrations.

Michael P. DeLorme

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25 JUNE 2012

Date