POLYBROMINATED DIBENZODIOXINS AND DIBENZOFURANS IN RESIDENTIAL AND FIREHOUSE DUST SAMPLES IN CALIFORNIA AND THE POTENTIAL FOR ANALYTICAL INTERFERENCE FROM POLYBROMINATED DIPHENYL ETHERS

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Introduction
Even with PBDEs being phased out in some parts of the world, a large reservoir of PBDE-containing products still exists, and PBDEs are still being produced in other parts of the world. Thermal and photolytic degradation are potential sources of polybrominated dibenzodioxins and furans (PBDD/Fs), and given the quantities of PBDEs in use, this is a potentially significant source of PBDD/Fs. PBDD/Fs have similar toxicities to chlorinated dioxins/furans (PCDD/Fs), and, like other POPs (PCBs, PBDEs, novel BFRs), residential and occupational dust could be a significant source of PBDD/F exposure. In the work described here, we build on our previous work in this area by applying a cleanup process for PCDD/F analysis to the analysis of PBDD/Fs in dust from both residential units and from the living quarters of fire houses. We also examine the potential for PBDEs to interfere with PBDF analysis.

Methods and Materials
Dust samples were collected from the vacuum cleaner bags from California houses and fire stations during 2010-11. These samples were already analyzed for PAHs and PCBs[1], novel BFRs[2], and PBDEs, with BDE 209 exceeding 390,000 ng/g in firehouse dust[3]. In this study, dust samples (<150 □m) were fortified with labeled internal standards and extracted using pressurized fluid extraction. Interferences were removed by using mixed-mode silica gel and carbon columns, and extracts were analyzed using high resolution isotope dilution GC/MS.

Results and Discussion
PBDFs and PBDEs are isobaric, and thus the potential for PBDEs to interfere with PBDF analysis is high. However, in a given PBDF acquisition window (e.g., TeBDF), the corresponding PBDEs elute well after the target PBDF congeners. Thus, even with very high levels of PBDEs in these samples, we do not anticipate interferences with PBDF analysis.

Preliminary house dust data show HpBDD/Fs to be the predominant congeners with up to 530 ng/g Total HpBDFs and up to ~5 ng/g Total HpBDDs. Other PBDF concentrations ranged from 12-37 ng/g. Other PBDD congeners were only detected at up to 0.1 ng/g. Preliminary data for the firehouse dust samples show HpBDD/Fs to be the predominant congeners as well, with up to 10,400 ng/g dust for HpBDF, and up to 5.2 ng/g for HpBDD. Other PBDF concentrations ranged from 12.3 to 144 ng/g, while other PBDD concentrations ranged from ND to 5.2 ng/g. Further analyses of residential and firehouse dust are underway.

References
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