

# DRAFT

## RJRT INTEROFFICE MEMORANDUM

### BIO/BIO R&D - ENVIRONMENTAL TOBACCO SMOKE DIVISION

TO: Dr. C. R. Green

FROM: Dr. G. B. Oldaker III  
Ms. T. C. DeLuca  
Mr. F. W. Conrad, Jr.  
Ms. P. S. Simmons

DATE: 4 May 1990

SUBJECT: Weekly Highlights for Real-Life Measures Group

Survey of ETS in Forsyth Memorial Hospital - Mr. Fred Conrad, Jr. and Ms. Paula Simmons initiated the second sampling phase of the Forsyth Hospital project; this phase includes use of the redesigned ETS monitoring system. Samples were collected in the nonsmoking section of the Intensive Care Unit (ICU) waiting room at Forsyth Memorial Hospital. The main objective of this phase of the project is to assess more completely the effect of smoker segregation on ETS exposures by determining ETS levels over extended time periods.

The first phase of the project involved investigation of ETS levels over short time periods and entailed use of portable air sampling systems (PASS's) to collect one-hour samples. With the ETS monitoring system, ETS levels are determined over 48-hour time periods. Samples were analyzed for nicotine and respirable suspended particles (RSP); next week, remaining analyses will be done including those for ultraviolet particulate matter (UVPM) and fluorescent particulate matter (FPM). Preliminary results are expected shortly thereafter.

Training - Mr. Fred Conrad is training Ms. Paula Simmons relative to performing analyses for UVPM and FPM. This training complements that provided in connection with the operation of the ETS monitoring system.

Publications - The manuscript titled "Estimation of the Effect of Environmental Tobacco Smoke on Air Quality in Passenger Cabins of Commercial Aircraft. II" was published in *Indoor Air Quality and Ventilation* (F. Lunau and G. Reynolds, Eds., Selver, London, pp. 447-454). This paper describes a cooperative study done during December 1987 by scientists with Philip Morris and RJRT in Japan Air Lines (JAL) aircraft on flights connecting New York City, Tokyo, and Hong Kong. Authors from RJRT include Ms. Barbara Collie, Ms. Melanie Stancill (formerly with RJRT), Mr. Fred Conrad, Jr., and Dr. Guy Oldaker.

Presentations - The 1990 EPA/A&WMA International Symposium on the Measurement of Toxic and Related Air Pollutants was held from 1 to 4 May. Drs. Paul Nelson and Guy Oldaker attended Session XI: "Nicotine in Environmental Tobacco Smoke," which was chaired by Dr. Delbert Eatough of Brigham Young University. Dr. Nelson presented a paper titled "Problems with the Use of Nicotine as a Predictive Environmental Tobacco Smoke Marker"; Ms. Barbara Collie, Ms. Katherine Maiolo, Mr. Dave Heavner, and Drs. Mike Ogden and Guy Oldaker were coauthors. Dr. Nelson

presented results from research done in the environmental chamber and in the field to assess the relations between nicotine and concentrations of other ETS indicators as a function of sampling time and ventilation rate. This paper demonstrated that the relation between nicotine and other ETS indicators is highly variable and that depending on the frame of reference, nicotine could either under- or overestimate ETS exposure. In addition, Dr. Nelson presented results showing that residual concentrations of nicotine can exist long after smoking has ceased. For example, nicotine can erroneously indicate exposure to ETS respirable suspended particles (RSP) because it can be measured in the absence of ETS RSP.

Mr. William Crouse of Lorillard presented a paper titled "Comparative Results from Area and Personal Sampling Methods for Nicotine in Environmental Tobacco Smoke." This paper showed that the portable air sampling system (PASS) overestimates personal exposure to nicotine. Therefore, results presented earlier in connection with surveys done using the PASS are conservative in their estimation of personal exposure to ETS nicotine.

Dr. Eatough gave a presentation titled "Cabin Air Quality: Cotinine as a Biomarker of Environmental Tobacco Smoke in Commercial Aircraft." In spite of knowledge of Dr. Nelson's paper, Dr. Eatough continued espousing his position that nicotine underestimates exposure to ETS because of its rapid decay, a position based primarily on results from experiments done in his environmental chamber with unrealistically high levels of ETS. Dr. Eatough's results from determinations of ETS constituents confirmed results reported earlier by RJRT scientists in connection with surveys done in B727, B737, and B747 aircraft. Additionally, Dr. Eatough presented results showing that through careful control of ETS exposure (specifically, by using Brigham Young University as a smoke-free control), a strong association could be demonstrated between nicotine exposure and cotinine levels in urine.

Dr. Eatough adeptly interjected policy and politics into his presentation. In discussing the relevance of exposure results, he emphasized the theme that the public should be "protected" from exposure to ETS and used as a benchmark the zero exposure condition. His argument, put simply, is that if any ETS is indicated, then there is too much exposure, and by implication, smoking should be banned. At several points in his presentation, Dr. Eatough noted that the major exposure for some subjects occurred in the airports. He neglected to state, however, that such exposure was minuscule. Is it coincidental that current activity on Capitol Hill is directed at banning smoking in airports?

Dr. Jane Chuang of Battelle Memorial Institute gave a presentation titled "Polycyclic Aromatic Compound Concentrations in Residential Air Associated with Cigarette Smoking and Gas or Electric Heating and Cooking Systems." This paper described a pilot study of eight homes that involved determinations of 15 polynuclear aromatic hydrocarbons (PAH's), five nitro-PAH's, five oxygenated-PAH's, and three nitrogen heterocyclic compounds. Results indicated that cigarette smoking showed statistically significant associations with levels of most of the substance measured. She also reported that nicotine showed strong correlations with many of these substances. Dr. Chuang presented graphs relating concentrations of nicotine, quinoline, and iso-quinoline that were remarkable similar; based upon the observed relationships among these and the fact that the latter two substances can be included within Battelle's analytical methodology for PAH's and related compounds, Dr. Chuang recommended that quinoline and iso-

quinoline be considered as useful indicators of exposure to ETS PAH's.

Dr. P. Koutrakis of the Harvard School of Public Health gave a presentation titled "The Impact of Cigarette Smoking on Indoor Aerosol Mass and Elemental Concentrations." This work focused on determining particle mass and associated elemental concentrations in 596 homes in New York. Using mathematical models, Dr. Koutrakis found that levels of chlorine, potassium, and cadmium were significantly associated with cigarette smoking. In addition, he compared results from determinations done in different living areas within the homes and found small differences, an observation leading him to conclude that survey designs can be simplified by sampling in a single living area rather than by attempting to sample in several living areas within each home.

Survey of ETS in Retail Stores - Mr. William Crouse of Lorillard prepared the list of establishments included in the sample population for the survey of ETS in retail stores. The list identifies establishments representing a random sample stratified by Standard Industrial Classification (SIC) code. Members of the Real life Measures Group will meet with Mr. Crouse on 9 May to discuss practical and technical issues relating to sampling in the places selected.