REVIEW OF METHODS USED TO DETERMINE NICOTINE ABSORPTION:

SPECIAL CONSIDERATION GIVEN TO THE METHODS REQUIRING DETERMINATIONS OF BLOOD CONCENTRATION OF NICOTINE OR COTININE

T. D. Darby, Ph.D. and James E. McNamee, Ph.D.

University of South Carolina, School of Medicine

SUMMARY

A review of the literature shows that previous research on the relationships between plasma cotinine and nicotine absorption has not adequately examined the pharmacokinetics of metabolism and clearance. A model was therefore developed to predict plasma cotinine concentration in terms of nicotine absorption, cigarette consumption and body weight. The model also provides sensitivity analysis for uncertainty in the estimates of percentage nicotine converted to cotinine and (body fluid) volume of distribution.

A preliminary analysis of cotinine levels in 288 Carlton and Barclay smokers indicates that, on average, these smokers absorb about twice the nominal FTC nicotine yields. That is, Barclay smokers absorb 0.33 mg/cigarette versus 0.18 mg (FTC method) and Carlton smokers absorb 0.19 mg/cigarette versus 0.11 mg (FTC method). Use of a different rate of nicotine conversion or volume of distribution would change the absolute values calculated for nicotine absorption, but the ratio of Barclay to Carlton would be maintained.

The sensitivity of plasma cotinine levels to