locations as each worker applied the spray to 20 dogs. All treatments were conducted indoors. Each dog was treated for 1 to 2 minutes. The elapsed time for each replicate ranged from 45 to 90 minutes per worker. Each worker wore a shirt with long or short sleeves and pants, but no other protective clothing. Urine was collected from each subject over a 24 hour period and analyzed for the propoxur metabolite isopropoxyphenol (IPP) (This is the same as 2-isopropoxyphenol or M2 discussed in Unit II.A.2.(a) of this document.) After reviewing the literature, EPA concluded that the total absorbed dose of propoxur is determined by adjusting the amount of IPP excreted by the following factors: the percent of propoxur excreted, the percent IPP is of all metabolites, and the relative molecular weights of the parent and the metabolite IPP (Refs. 10, 11, and 12)

(1) Kennel workers. An exposure estimate is not presented here because the Agency does not believe pet aerosol products are routinely used by kennel workers. The Agency believes that kennels are more likely to use shampoos or dips because they are more effective in getting rid of fleas and ticks. Shampoos are preferred to other formulations because they wash away dirt, fleas, and ticks in addition to the pesticidal action. Also, they are believed to be easier on the animal. Aerosols and trigger-pump sprays are sometimes used when a pet owner declines to have a pet shampooed or dipped. There are no propoxur shampoos or dips registered, and as noted elsewhere in this document, propoxur may no longer be applied with trigger-pump sprayers.

(2) *Pet owners.* In order to calculate lifetime exposure for pet owner applicators, EPA supplemented the mean exposure data from the aerosol exposure study with the following additional assumptions. Pet owners were assumed to weigh 70 kg, wear long sleeved shirts and long pants during application, and treat 1 dog four times per year over a 70–year lifetime (Refs. 6, 7, 12, 13, and 14). Exposure was estimated at 6.4×10^{-3} mg/kg/day per application day.

d. Aerosol spray study of Residential Applicator (RA) exposure. In response to the 1987 DCI, Miles Inc. submitted a study of residential applicator exposure (Ref. 15). In this study, a 16 oz. aerosol can containing 1 percent a.i. was sprayed into cracks, crevices, baseboards, under sinks, and in other places where insects might be found. A total of 15 sets of data were collected. Applicators wore long sleeved shirts, long pants, shoes, and baseball caps. Dermal exposure data were gathered from gauze patches attached both outside and inside the clothing and on the cap. Hand exposure data were gathered from an ethanol handwash. Respiratory exposure data were gathered from microfilters contained in a cassette attached to the lapel of the applicator.

(1) RA exposure to aerosols. EPA used additional assumptions to calculate exposure as follows: the RA weighs 70 kg, breathes 1.7 m³ of air per hour, uses up the entire can of aerosol with each use, uses four cans per year, and during application wears a short sleeve shirt, shorts, and shoes, which EPA believes is a reasonable clothing scenario. Residues below the level of detection were assumed to be present at one-half the level of detection. The RA was assumed to apply propoxur every year from age 18 to age 70. RAs were exposed for 1 hour per application through dermal and inhalation exposure. (Respiratory exposure estimates were found to be negligible compared to dermal exposure.) Dermal absorption was assumed to be 50 percent because a homeowner applicator is assumed to remain in the residence following application. Exposure was calculated at 2.1×10^{-4} mg/kg/day (Refs 6, 7, 16, 17, 18, and 19).

(2) Outdoor uses. EPA also considered RA exposures for outdoor application of propoxur aerosols, which are designed to eradicate hornet and wasp nests around buildings and homes. These insects commonly nest in eaves of buildings and underneath building structures with overhangs. These products are generally equipped with a delivery system that will allow the operator to apply the aerosol at a safe distance from the nest. An applicator of these formulations of propoxur is likely to be exposed for a shorter time than would occur with indoor use products. It is also likely that the volatile formulations would dissipate more quickly than similar formulations used indoors. Thus, the exposure and corresponding risk from outdoor aerosol uses can be expected to be lower than is estimated for those used in indoor treatments (Ref. 15).

(3) *RTU liquid application by RAs.* EPA has used the aerosol spray study to calculate the maximum exposure RAs incur when applying RTU liquids with a compressed air sprayer to cracks and crevices. EPA assumed that the RA would wear a short sleeved shirt, shorts, shoes, and no gloves and would apply an RTU liquid four times per year. Only dermal exposure data were used to calculate exposure, because inhalation was considered to be negligible. Exposure was estimated at 2.1×10^{-4} mg/kg/day. If the RA applicator wears clothing similar to a PCO, that is, long sleeved shirt, long pants, and gloves, exposure would be less (Refs. 6, 7, 12, 16, 17, 18, 19, 20, and 21).

(4) Granular products applied by RAs. Some granular products are registered for use in and around the home (including limited outdoor application to driveways, sidewalks, patios, and foundations). These products are applied indoors by pouring from a paper container into a tray which is then placed under refrigerators, by lightly applying the product to floor under sinks or refrigerators, or by application to cracks and crevices that are inaccessible to children. They are not applied by general broadcast treatment indoors or in large quantities. While there are no quantitative data addressing this use scenario, EPA believes that potential dermal exposure would not exceed that received from an aerosol spray can while wearing a long sleeve shirt and long pants. Respiratory exposure would be negligible (Ref. 9). Exposure from the limited outdoor applications is not expected to be greater than indoor exposure. The limited outdoor use still permitted (application to sidewalks, patios, foundations, and driveways) is expected to present negligible exposure to RAs.

e. Other applicator exposure estimates. PCO and RA exposures from total release aerosol foggers, impregnated strips, shelf paper, enclosed or containerized baits, pet dabons, and tick and flea collars have not been estimated but are believed to be negligible (Ref. 6).

2. Post application exposure. Residents of homes are exposed from post-application exposures, through dermal and inhalation routes of exposure. Home residents may also be exposed while treating household pets.

a. Crack and crevice study of postapplication exposure. In response to the 1987 DCI, Miles Inc. submitted an acceptable study of post application residential exposure following a crack and crevice and limited structural surface treatment by commercial applicators in five homes using Baygon 70 WP insecticide diluted to a label rate of 1.1 percent a.i. (Ref. 22). The material was applied as a coarse spray to cracks, crevices, baseboards and other areas treated for insect control using a compressed air sprayer. An average of 1.2 oz of a.i. was applied to each house. Surface residues and air levels of propoxur were measured at intervals of up to 48 hours after treatment. Eighteen samples of each of three types of surfaces were monitored: vinyl tile squares represented floors and counters,