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Office of Pollution Prevention and Toxics (OPPT)
Environmental Protection Agency (EPA)
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Washington, DC 20460–0001
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To Whom It May Concern:

The following comments on the TSCA Section 21 petition to assess and reduce the health risks posed by air fresheners, submitted by the Sierra Club, the National Center for Healthy Housing, the Alliance for Healthy Homes, and the Natural Resources Defense Council (NRDC), are submitted on behalf of the more than 1.8 million members and supporters of People for the Ethical Treatment of Animals (PETA) who care about the suffering of animals in laboratory experiments. PETA is the world's largest animal rights organization and is committed to promoting the best available science to protect public health through the acceptance of non-animal test methods.

The petitioners request four items:

1. Call-in allegations of adverse reactions recorded by manufacturers and processors pursuant to TSCA § 8(c) and 40 CFR 717.
2. Adoption of a rule pursuant to TSCA § 8(d) to require submittal of health and safety studies related to air fresheners, including lab results of ingredients and health effects from respiratory exposures.
3. Adoption of a rule pursuant to TSCA § 4 to require manufacturers to test their products for respiratory exposures and sensitization.
4. Adoption of a rule pursuant to TSCA § 6 to require labeling on all air fresheners that contain phthalates.

In principle, we have no objection to the first, second and fourth points. Reporting allegations of significant adverse reactions to consumers' health, called for in the first point, would generate useful exposure data, as would submitting unpublished health and safety studies called for in the second point. In addition, any existing animal data would be made available to reduce or eliminate the further use of animals in new studies. We have therefore always supported – and indeed have called for – submittal of unpublished data under Section 8 prior to initiation of Section 4 rulemaking. Similarly, we are not concerned with the labeling requirements called for in the fourth point.

We are, however, completely taken aback by the petitioners' call for health effects testing in the third point. The petitioners spell out the intended testing as "acute and chronic studies that use appropriate exposure routes and that capture a diversity of life stages and health conditions, such as asthma, *for large populations of mammals* [emphasis added]." Even if we accept the

petitioners' contention that "there are insufficient data and experiences upon which the effects of air fresheners on the general public can reasonably be determined or predicted," their conclusion that "[animal] testing is necessary to develop the needed data" is not supported. Instead, thoroughly characterizing air freshener emissions and accurately assessing consumer exposure are more timely and relevant means to fill the perceived data gaps.

The petitioners cite three major reports: the American Association of Poison Control Centers (AAPCC) 2005 Annual Report; the European Commission's Scientific Committee on Health and Environmental Risks (SCHER) Report on Air Fresheners; and the NRDC Report on Phthalates in Air Fresheners. Rather than support the petitioners' call for animal testing, however, the AAPCC and SCHER reports would seem to oppose it. Only the NRDC report, which is limited in its analysis and flawed in its methodology, reaches the conclusion – as the NRDC always does – that more animal testing is necessary.

Of nearly 2.5 million total exposures called in to AAPCC in 2005, 14,123 (0.6%) of the exposures were to air fresheners. Of 5,712 adverse health outcomes recorded for the air freshener exposures called in, 5,580 (98%) are described as "none" or "minor", 126 (2%) are described as "moderate", five (less than 0.1%) are described as "major", and one death was recorded.[1] The petitioners cite this report as evidence of widespread public exposure to air fresheners. While any adverse health effects or deaths are clearly regrettable, we believe that it is at least arguable whether these data, seen in the context of the entire report, point to an urgent but overlooked public health concern. In addition, these data represent a pool of human exposure data that could easily be characterized further. Such characterization would necessarily be more relevant to human toxicity than any animal study.

The SCHER report is a comprehensive 2006 review which examines the results of a Bureau européen des Unions de Consommateurs (BEUC) study documenting tests of emissions from 74 consumer air freshener products in the context of the existing bodies of literature on air freshener emissions and on the toxicities of the individual compounds identified in the BEUC study. These individual compounds are also those identified in the petition at hand: benzene; formaldehyde; terpenes, especially limonene; styrene; diethyl phthalate; and toluene. The SCHER report notes that these compounds are already well studied, having been evaluated by international bodies including the European Union, U.S. EPA, and World Health Organization (WHO). Notably, the highest values for formaldehyde, styrene and toluene found in the BEUC study remained below WHO guidance values, and the highest values for styrene and toluene remained below guidance values even when added to the typical residential background. While the highest concentrations obtained for limonene, a commonly used flavoring that is also a known skin sensitizer, exceeded the upper value suggested for repeated exposure, they remained below acutely irritating concentrations.

The highest levels of benzene and formaldehyde were emitted from incense, with the highest concentration of benzene (221 $\mu g/m^3$) more than 25-fold higher than that emitted from liquid air fresheners (8 $\mu g/m^3$). The SCHER report observes that the burning of incense produced

[1] 2005 Annual Report of the American Association of Poison Control Centers' National Poisoning and Exposure Database. 2006. *Clinical Toxicology*, 44:803–932.

abnormally high benzene concentrations in the indoor air and, in this specific case, cautions that because benzene is a human carcinogen; such emissions need attention to diminish exposure.

The SCHER report concludes that the results reported in the BEUC study may, in a first approximation, be regarded as realistic worst case values and recommends that further quantification of emissions from and consumer use pattern of air fresheners is needed. Not surprisingly, no mention is made of new animal toxicity testing.[2]

The NDRC report is similar to the BEUC study in that it documents tests of emissions from 14 air freshener products. However, while the BEUC tested for total volatile organic compounds (VOCs) as well as the individual components mentioned above, the NRDC tested only for phthalates. The NRDC reports that 12 of the products tested had detectable levels of phthalates and that three had very high levels ranging from 360 ppm to 7,307 ppm. The NRDC claims that the results obtained were consistent with those reported by the BEUC, noting that DEP concentrations ranged from 0.2 to 82 ppm in the BEUC study and that these levels are similar to levels that the NRDC found in five of the products tested, although they are lower than those found in the three products with the highest measured levels. Notably however, the NRDC fails to mention the strikingly different methodologies employed in the two studies. The BEUC study attempted to simulate the use of air fresheners by consumers and to test them under realistic conditions of use. Air samples were taken from clean rooms by validated commonly used methods following use of the air freshener products. In contrast, the NRDC measured phthalate concentration directly using one to two milliliters of liquid from liquid products or by spraying aerosol products into volatile organics analysis vials. A gel product was extracted in acetone prior to analysis.[3] Clearly, values obtained through these direct measurements would be expected to be higher than those obtained through air sampling simulating typical conditions of use.

In addition to overstating the potential exposure to phthalates from air fresheners, the NRDC overstates the health risks this exposure represents. For example, the executive summary states:

> Numerous animal studies have linked prenatal exposure to certain phthalates with decreases in testosterone, malformations of the genitalia, and reduced sperm production. In humans, phthalates have been associated with changes in hormone levels, poor semen quality, and changes in genital development.[4]

What the NRDC fails to mention is that the existing data indicate that humans are much less sensitive than rodents to the developmental and reproductive effects of phthalates and that the evidence for these effects in humans is inconclusive. The observed lower sensitivity of humans to phthalate exposure can be explained by less efficient absorption, lower activity of metabolic enzymes, and faster excretion.[5] One of the studies cited for the above statement regarding effects

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[2] Commission's Scientific Committee on Health and Environmental Risks (SCHER), Opinion on the report "Emission of chemicals by air fresheners. Tests on 74 consumer products sold in Europe." 2005. Available at http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_o_026.pdf.
[3] Cohen, Alison et al. 2007. Hidden Hazards of Air Fresheners. Natural Resources Defense Council.
[4] Id.

in humans, Main et al. (2005),[6] found no association between phthalate levels and cryptorchidism (a malformation of the testes). Another of the studies cited, Swan et al. (2005)[7] has been widely criticized. Dr. Rebecca Goldin, of George Mason University's Statistical Assessment Service challenged the statistical significance of the correlations between phthalate exposure and changes in anogenital index reported in this study, concluding that at an appropriate "level of statistical significance, not one phthalate passed the test of a statistically significant correlation."[8] Further, Rais-Bahrami et al., (2004)[9] observed no developmental or reproductive effects in humans of exposure to one phthalate even at the relatively high levels found in medical-treatment related exposures.

In addition to the difficulties with extrapolation of results of phthalate exposure from rodents to humans noted above, inter-species extrapolation for the inhalation route of exposure is further complicated by anatomical and physiological differences. A recently published research concept document by the National Toxicology Program (NTP) for the VOC diacetyl reported that initial studies showed that the primary target site for diacetyl vapors in rodents is the nasal cavity, whereas in humans, the primary target site is the bronchioles. The document explains that the "rodent nasal cavity is much more efficient than that of humans in removing direct-acting irritants from inhaled air. Rodent nasal turbinates are anatomically more complex and have a larger surface area relative to the human nasal turbinates. For this reason, the rodent nasal cavity receives the highest inhaled dose of diacetyl and the greatest injury while the bronchioles are protected." Further, "[r]odents are obligate nose breathers, and humans are both mouth and nose breathers… In humans, mouth breathing bypasses the scrubbing action of the nose and may allow more diacetyl to reach the distal airways."[10] It is reasonable to expect analogous difficulties in testing the VOCs emitted from air fresheners. Finally, we note that toxicity testing by the inhalation route of exposure is especially cruel with animals confined to a gas chamber, squeezed tightly into inhalation tubes, or restrained with a breathing apparatus over their mouths.

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[5] Rhodes C et al. 1986. Comparative pharmakcokinetics and subacute toxicity of di(2-ethylhexyl) phthalate (DEHP) in rats and marmosets : extrapolation of effects in rodents to man. *Environ Health Perspect* 65:299-308; Astill BD. 1989. Metabolism of DEHP: effects of prefeeding and dose variation and comparative studies in rodents and the cynomologus monkey (CMA studies). *Drug Metab Rev* 21:35-53; Silva MJ et al. 2003. Glucuronidation patterns of common urinary and serum monoester phthalate metabolites. *Arch Toxicol* 77:561-567; Kato K et al. 2004. Mono(2-ethyl-5-hydroxyhexyl) phthalate and mono-(2-ethyl-5-oxohexyl) phthalate as biomarkers for human exposure assessment to di-(2-ethylhexyl) phthalate. *Environ Health Perspect* 112: 327-330; W, et al. 2004. Blood burden of di(2-ethylhexyl) phthalate and its primary metabolite mono(2-ethylhexyl) phthalate in pregnant and nonpregnant rats and marmosets. *Toxicol Appl Pharmacol* 195: 142-53; Kurata Y et al. 2005. Metabolism of di(2-ethylhexyl) phthalate (DEHP) in juvenile and fetal marmoset and rat. *The Toxicologist* 84(S-1):1251; Ito Y et al. 2005. Species differences in the metabolism of di(2-ethylhexyl) phthalate (DEHP) in several organs of mice, rats, and marmosets. *Arch Toxicol* 79:147-154.

[6] Main KM et al. 2006. Human Breast Milk Contamination with Phthalates and Alterations of Endogenous Reproductive Hormones in Infants Three Months of Age. *Environ Health Perspect* 114:270-276.

[7] Swan SH et al. 2007. Decrease in Anogenital Distance among Male Infants with Prenatal Phthalate Exposure. *Environ Health Perspect* 113:1056-61.

[8] Goldin R. Media Claims Phthalates (Might) Cause Genital Defects. 2005. Available at http://www.stats.org/stories/media_claims_phthala_may27_05.htm.

[9] Rais-Bahrami K et al. 2004. Follow-up study of adolescents exposed to di(2-ethylhexyl) phthalate (DEHP) as neonates on extracorporeal membrane oxygenation (ECMO) support. *Environ Health Perspect* 112:1339-1340.

[10] NTP Research Concept: Artificial Butter Flavoring and Certain Components, Diacetyl and Acetoin. 2007. National Toxicology Program. Available at http://ntp.niehs.nih.gov/files/Artificial_butter_flavoring_concept_for_BSC.pdf.

In conclusion, while there may be legitimate concerns about specific risks to human health from exposure to air fresheners, such as the exposure to high concentrations of benzene resulting from incense burning, the call for animal testing is completely unsupported nor will animal testing generate the answers the petitioners are seeking. The health effects of the individual components of air freshener emissions identified have already been well-studied. In addition, differences in anatomy and in ADME between rodents and humans, particularly for inhalation exposures and for phthalates, complicate inter-species extrapolation and render the interpretation of the results from animal experiments meaningless. We request that the EPA deny the third point of the petition which calls for the adoption of a rule requiring manufacturers to test their products for respiratory exposures and sensitization.

Thank you for your attention to these comments. I can be reached by email at josephm@peta.org or by telephone at (757) 622-7382, ext. 8001.

Sincerely,

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