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Attention: Dr. Robert Leavitt
Branch Chief, Executive Secretary, EATF

Subject: CheckMate LBAM-F particle size distribution

Reference: Your letter to Knepp and Haferman dated April 22, 2008

Dear Dr. Leavitt:

Thank you for your letter of April 22 regarding the measurements of the size distribution of the micro-capsulses in CheckMate LBAM-F. You state that our calculations of the particle size distribution, mean diameter, and median diameter agree with your corrected interpretation of the measurements of the CheckMate micro-capsules. Now let's use the information that you agree is correct to consider the potential health effects of the CheckMate micro-capsules and embedded artificial pheromone.

Micro-capsule diameter

The CDFA has repeatedly stated that CheckMate is a "pheromone," applied in small quantities, and consisting of micro-capsules that are too large to be a problem to the human respiratory system. On October 9, in Monterey County Superior Court, James Warren of the United States Department of Agriculture filed a statement that reads: "CheckMate is composed of small (80-150 micron) micro-capsules..." In the Consensus Statement on Human Health, the California Department of Pesticide Regulation and the Office of Environmental Health Hazard Assessment stated on Oct 31, 2007: "The micro-capsule particles are very large by inhalation standards (25 micrometers in diameter or larger) and unable to reach the deep lung ... As a result, an inhalation toxicity study ... would not be useful and was not conducted." In your letters of March 13 and April 9 to the Environmental Advisory Task Force, you wrote: "You can see from the analysis that the median micro-capsule diameter (50 percent larger and 50 percent smaller) is 97 micrometers."

The table at the bottom of Figure 3 in the attachments to your April 22 response to our letter of April 16 finally gives the truth. The average micro-capsule diameter is 16.7 micrometers and the median is 9.8 micrometers, in very good agreement with our calculations

of April 16. In other words, **half of the micro-capsules have diameters less than 10 micrometers.**

We ask for an investigation of the basis of the earlier CDFA court filing and statements that the particles were "large." This false information was used to justify spraying of about one hundred thousand people in Monterey and Santa Cruz without prior testing for health effects.

Size Matters

Small particles with diameters less than 10 micrometers are referred to as PM_{10} by the Environmental Protection Agency. According to the American Lung Association, PM_{10} can consist of solids, dust, ash, and aerosols and is one of the greatest health concerns (along with ozone) from the air we breathe. There is a strong relationship between PM_{10} and illness, hospitalization, and premature death. The people most affected are pregnant mothers, infants, small children, older adults, and people with existing respiratory problems.

You calculate the additional PM_{10} loading from the spraying in your April 22 letter. You obtain a value of 18 micrograms per cubic meter if the particles are uniformly dispersed in the 3 meter air-column close to the ground. Your value is close to the average 24-hour PM_{10} measured last year at the monitoring station near the Watsonville airport (19 micrograms per cubic meter). That is to say, PM_{10} loading from the spraying approximately doubles the concentration of PM_{10} in our air. Note that your calculation included only PM_{10} from the micro-capsules and the artificial pheromone, not the water and inert substances that make up 80% of CheckMate. The inert material may contribute additional PM_{10} which is not included in your calculation.

As you know health effects of PM_{10} persist at concentrations well below the current air quality standards. According to *Zanobetti, et al.,* [2000], there is an increase in the daily rate of hospitalization for pneumonia by 1.95% for each increase in PM_{10} of 10 micrograms per cubic meter. About 1 in 300 people are hospitalized per year for pneumonia. Let's estimate the impact of PM_{10} on a population of 5 million people, the number of people you plan to spray in 2008. In a population of 5 million, about 17,000 would be hospitalized for pneumonia in an average year, or about 46 per day. An increase of PM_{10} of 18 micrograms per cubic meter over a 30-day exposure period increases the number of hospitalizations by

$$0.0195 \times \frac{18}{10} \times 46 \times 30 = 48 \tag{1}$$

Samet et al., [2000] estimated the increase in the rate of death from cardiovascular and respiratory causes as 0.68% for each increase in PM_{10} of 10 micrograms per cubic meter. In our population of 5 million, normally around 15,000 would die per year from these two causes, or about 41 deaths per day. An increase of PM_{10} of 18 micrograms per cubic meter over a 30-day exposure period increases the number of premature deaths by

$$0.0068 \times \frac{18}{10} \times 41 \times 30 = 15 \tag{2}$$

These estimates of increased hospitalization and death apply to an overall population of 5 million, with 30 days of exposure to the same PM_{10} level you give in your letter of April 22. We used an exposure duration of 30 days as an example for this letter. The true duration may be up to 9 months per year. Of course these are simply estimates, estimates based on what we think are reasonable assumptions.

There are many additional scientific papers on this issue cited as references in *State of the Air: 2008* and *Review of the National Ambient Air Quality Standards for Particulate Matter* [2005]. In the 2005 report by the Environmental Protection Agency, there are almost forty references that relate increased death rates to PM_{10}.

It seems reasonable to expect even greater likelihood of occurrence of less grave respiratory problems. The numbers above do not include people who go to their doctors with an asthma attack, wheezing, a rash, or a headache. We believe that PM_{10} explains some of the health problems reported by over 600 people who were sprayed in Monterey and Santa Cruz in the fall of 2007 *(HOPE Executive Summary of 643 Health Complaints)*.

PM_{10} from inert ingredients

According to your April 22 letter, the PM_{10} loading value of 18 micrograms per cubic meter does not include possible PM_{10} from the inert ingredients in CheckMate. Do the inert ingredients contribute additional PM_{10} or not?

In order to estimate the PM_{10} from the so-called inert ingredients, the CDFA must supply the "recipe" for CheckMate OLR-F and CheckMate LBAM-F. To date, the State of California has publicized only the ingredients of CheckMate LBAM-F. The ingredients of CheckMate OLR-F are secret. The recipes for both pesticides are secret.

How long does CheckMate remain in our lungs?

Finally, in your April 22 letter, you state that 80% of the ingredients in CheckMate consist of water and other inert material. This leads us to think of CheckMate as a paint-like substance with the micro-capsules suspended in a water-based fluid. The human body is mostly water and our lungs may provide an environment similar to the fluid (water plus inert ingredients) in which the micro-capsules are suspended. How long should we expect inhaled PM_{10} to stay in our lungs?

Additional studies required

In addition to our questions above, we seek a third-party scientific and medical study of the relationship between CheckMate-produced PM_{10} (including the inert ingredients) and the illnesses reported in Monterey and Santa Cruz after the aerial spraying in 2007.

Finally, we demand a sound, third-party medical study of both the acute (short-term) and the chronic (long-term) effects of aerial spraying of CheckMate on respiratory health.

Sincerely,

Dennis L. Knepp, Ph.D.

Jeff Haferman, Ph.D.

References

HOPE Executive Summary of 643 Health Complaints, at web address:
http://forum.stopthespray.org/viewtopic.php?f=18&t=280

A. Zanobetti, J. Schwartz, and D. W. Dockery, "Airborne Particles Are a Risk Factor for Hospital Admissions for Heart and Lung Disease," *Environmental Health Perspectives*, Vol. 108, No. 11, November 2000. The authors are with the Environmental Epidemiology Program, Department of Environmental Health, Harvard School of Public Health, Boston, Mass.
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Jonathon M. Samet, M.D., Francesca Dominici, Ph.D., Frank C. Curriero, Ph.D., Ivan Coursac, M.S., and Scott L. Zeger, Ph.D., "Fine Particle Air Pollution and Mortality in 20 U.S. Cities, 1987-1994," New England J Medicine, Vol. 343, pp. 1742-1749, December 14, 2000. Authors are with the Johns Hopkins School of Medicine. The web address is
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Consensus Statement of Human Health Aspects of the Aerial Application of Microencapsulated Pheromones to Combat the Light Brown Apple Moth, October 31, 20007.

Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS, US Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, EPA-452/R-05-005a, December 2005.

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American Lung Association, State of the Air: 2008, The State of the Air in California. You can download the report: http://www.stateoftheair.org/