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Biomonitoring California c/o OEHHA
Attn: Sara Hoover
Chief of the Safer Alternatives Assessment
and Biomonitoring Section in OEHHA
1515 Clay St, 16th Floor
Oakland, CA 94612

RE: Submission of Documents Related to Musks

Dear Ms. Hoover:

We are pleased to submit for your consideration a series of documents regarding musks. As per our conversation via conference call on February 6, The International Fragrance Association, North America (IFRA North America) and its members, aided by the Research Institute for Fragrance Materials, assembled a series of relevant published and unpublished information pertaining to the environmental and health risks for a group of fragrance materials, classed as "musks" based on their odor profiles, which are being evaluated by OEHHA in the Chemical Selection Planning program.

By way of introduction, IFRA North America is the principal trade association representing the fragrance industry in the U.S. Our member companies create and manufacture fragrances and scents for personal care, home care, industrial and institutional use as well as home design products all of which are manufactured by consumer goods companies. We work closely with Research Institute for Fragrance Materials (RIFM), the international scientific authority on the safety of fragrance materials as well as the global International Fragrance Association which uses scientific criteria developed by RIFM to set usage guidelines and/or restrictions on fragrance materials.

As referenced in the presentation given by Dr. Krowech at the end of last year, musk materials are in use in perfumery and have been for over 150 years. As such, details of the different groups of musks and their structures, exposure, use and hazard information have been heavily evaluated by the fragrance industry. As discussed during our call, the fragrance industry's safety evaluation program has been in place since the late 1960's; the core of this program is RIFM which, in addition to analyzing scientific data, engages in testing and evaluation by an independent panel of experts from academia.

In addition to performing analysis and assessment of fragrance materials, RIFM houses all data including scientific studies, literature and publications in a secure database. Data summaries are available online to all database subscribers.

In an effort to assist OEHHA in its assessment of musk materials and to address some of the points and questions posed to Biomonitoring California's Scientific Guidance Panel, IFRA North America has consulted with RIFM and key member companies to communicate published and unpublished information, some of which may not have been available in the initial OEHHA review. In determining the best method to provide this information, based on usage reports by member

companies, we aimed our focus on the highest tonnage materials in each category to represent each class of musks as outlined in Dr. Krowech's presentation. These include the following:

- **Nitromusks:** Musk ketone (CASRN 81-14-1)
- **Polycyclic musks:** Galaxolide (CASRN 1222-05-5), Tonalide (CASRN 1506-02-1, 21145-77-7)
- **Macrocyclic musks:** Ethylene brassylate (CASRN 105-95-3), Ethylene dodecanedioate (CASRN 54982-83-1), Habanolide (CASRN 111879-80-2)
- **Alicyclic musks:** Helvetolide CASRN 141773-73-1)

In determining the representative musks outlined in this submission, there were several considerations made. Although musk xylene is mentioned in Dr. Krowech's report, its use in fragrance is banned by IFRA and we are not aware of any other consumer uses of this material. As noted in the report, musk xylene has been classed as very persistent and very bioaccumulative (vPvB) in the European Union. Further, although Iso E Super was included in Dr. Krowech's report on musk materials, it is important to point out that this material is not classified as a musk, and its structure is sufficiently dissimilar from that of Tonalide in that it does not have the characteristic musk odor. Thus, we have not included Iso E Super in this review.

We have also included below the most recent volume of use data for North America in banded format for the above referenced materials. Note that IFRA proactively surveys its membership every two years and publishes a list of all materials reported in use in fragrance compounds. This was last updated with data from 2011 and reflected below for the group of materials representative of the four classes of musks:

- Musk ketone: 10-15 metric tons
- Galaxolide: 1,500-2,000 metric tons
- Tonalide: 100-150 metric tons
- Ethylene brassylate: 500-600 metric tons
- Ethylene dodecanedioate: 200-250 metric tons
- Habanolide: 250-300 metric tons
- Helvetolide: 35-40 metric tons

Further, as a supplement to this cover letter, please find enclosed a disc containing a series of publications pertaining to the four classes of musks. Below is a brief summary of each document uploaded to the disc:

1. European Union Risk Assessment Report for Musk Ketone, (2005).
The conclusion of this risk assessment from the perspectives of human health and the environment was: "There is at present no need for further information and/or testing and no need for risk reduction measures beyond those, which are being applied already."

2. European Union Risk Assessment Report for Galaxolide (HHCB), (2008).
The conclusion of this risk assessment from the perspectives of human health and the environment was: "There is at present no need for further information and/or testing and no need for risk reduction measures beyond those, which are being applied already."

In addition to the EU risk assessment, the U.S. Environmental Protection Agency (EPA) also drafted a risk assessment on HHCB as a part of its overall efforts to enhance the Agency's

existing chemicals management program. The risk assessment is currently being peer reviewed and finalized but the draft version can be accessed at: http://www.epa.gov/oppt/existingchemicals/pubs/TSCA_Workplan_Chemical_Risk_Assessment_of_HHCB.pdf

3. European Union Risk Assessment Report for Tonalide (AHTN), (2008).
The conclusion of this risk assessment from the perspective of human health for consumers and the environment was: "There is at present no need for further information and/or testing and no need for risk reduction measures beyond those, which are being applied already." This conclusion applies to all compartments and all scenarios. From the perspective of human health for workers, a conclusion was reached that there is a need for limiting the risks, due to a photosensitization potential. The overall conclusion of the review body was that "There is at present no need for further information and/or testing and no need for risk reduction measures beyond those which are being applied already."

4. A series of publications, written by the Research Institute for Fragrance Materials (RIFM), and appearing in Food and Chemical Toxicology, summarizing the available data for the following macrocyclic lactone musks: 6-Hexadecenlactone (2011); 10-Oxahexadecanolide (2011); 11-Oxahexadecanolide (2011); 12-Oxahexadecanolide (2011); 16-Hydroxy-7-hexadecenoic acid lactone (2011); Cyclopentadecanone (2011); E- and Z-Oxacyclohexadec-12(+13)-en-2-one (2011); Ethylene brassylate (2011); Ethylene dodecanedioate (2011); Hexadecanolide (2011); Oxacycloheptadec-10 ene-2-one (2011); Oxacyclohexadecane-2,13-dione (2011); Pentadecalactone (2011); and an overview of macrocyclic lactones and lactides in use as fragrance ingredients.

5. A series of publications, written by the Research Institute for Fragrance Materials (RIFM), and appearing in Food and Chemical Toxicology, summarizing the available data for the following macrocyclic ketone musks: 3-Methyl-1-cyclopentadecanone (2011); 3-Methylcyclopentadecenone (2011); 4-Cyclopentadecen-1-one, (Z)- (2011); 5-Cyclohexadecen-1-one (2011); Cycloheptadeca-9-en-1-one (2011); Cyclohexadec-8-en-1-one (2011); Cyclohexadecanone (2011); and an overview of macrocyclic ketones in use as fragrance ingredients.

6. A peer-reviewed publication, including the publication's supplemental information (2011), written by the Research Institute for Fragrance Materials (RIFM), and appearing in Ecotoxicology and Environmental Safety, summarizing the available environmental fate and effects data for the macrocyclic lactones, lactides and ketones

7. An internal summary report of unpublished data for the alicyclic musk Helvetolide (2013). The conclusion of this report is that Helvetolide is not a substance that is likely to be measured in the environment (biota/ environmental compartments).

8. A Scientific Committee on Consumer Safety (SCCS) published final opinion on HHCB in 2002 concerning the safety for use in cosmetic products and the potential need for any restrictions or conditions for its use.

9. A Scientific Committee on Consumer Safety (SCCS) published final opinion in 2002 on AHTN concerning the safety for use in cosmetic products and the potential need for any restrictions or conditions for its use.

We believe that these data, many of which have been unpublished until now, support the conclusion that the musk materials currently in use as fragrance ingredients do not present a risk for the environment or human health. We encourage you to review this submission in its entirety and we look forward to scheduling a follow-up discussion to elaborate on any of the studies contained on the disc or the points made in this cover letter.

In closing, it is our sincerest hope that this proactive submission is a step towards continuing to cultivate a positive and collaborative relationship between the fragrance industry and Office of Environmental Health Hazard Assessment.

Respectfully,

Megan Ekstrom
Manager, Government Affairs

cc: Dr. Gail Krowech