ICCR-2

ASSOCIATION PANEL REPORT NANOTECHNOLOGY IN COSMETICS

October 31, 2008

CANADIAN COSMETICS, TOILETRY AND FRAGRANCE ASSOCIATION
THE EUROPEAN COSMETICS ASSOCIATION
JAPAN COSMETIC INDUSTRY ASSOCIATION
PERSONAL CARE PRODUCTS COUNCIL[1]

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1. INTRODUCTION:

The International Cooperation on Cosmetics Regulations (ICCR) initiative is a voluntary international group of cosmetics regulatory authorities from the United States, Japan, the European Union, and Canada[1]. ICCR was created to identify ways to remove regulatory obstacles among the regions, while maintaining the highest level of global consumer protection.

The first meeting, ICCR-1, was held in Brussels, September 26-28, 2007 and identified six priority work items:

1. Good Manufacturing Practices
2. Ingredients labeling/INCI;
3. Nanotechnology;
4. Market surveillance;
5. Authorized substances; and
6. Animal testing and alternative methods.

A more detailed discussion of the priority items can be found in the Regulators report "International Cooperation on Cosmetic Regulation: Outcome of Meeting, September 26-28, 2007" posted at the ICCR member web sites[2].

More specifically, on Item #3 - Nanotechnology, ICCR invited industry to:

- develop common definitions for nanotechnology in the field of cosmetics; and
- set up an inventory of current application of nanotechnology in this field.

ICCR will use this information in order to determine the path forward in this area.

Responding to this request a panel of the Canadian Cosmetic Toiletry and Fragrance Association, COLIPA, Japanese Cosmetic Industry Association and the US Personal Care

[1] ICCR members are: the Food and Drug Administration of the United States of America; the Ministry of Health, Labour, and Welfare of Japan; the European Commission Directorate General Enterprise; and Health Canada.

[2] FDA at http://www.cfsan.fda.gov/~dms/cosiccr.html; Health Canada at http://www.hc-sc.gc.ca/cps-spc/person/cosmet/info-ind-prof/iccr_e.html and the European Commission at http://ec.europa.eu/enterprise/cosmetics/html/cosm_intnl_aspects.htm

Products Council (the Panel) was formed to gather input in order to represent all affected industry sectors.

The Panel presented its report to ICCR at the second annual meeting (ICCR-2), held July 30-August 1, 2008 to ICCR. In its report to ICCR the panel acknowledges the specific request of ICCR for definition of *nanotechnology* and did provide one. However the panel concluded that fully addressing the question underlying the request (i.e. an inventory of current application) also required a definition for *nanomaterials* that would be relevant in a context of cosmetic products.

The Panel reported it had reviewed a number of existing definitions and concluded that a definition based solely on size would be insufficient as we have routinely addressed substances ranging from the atomic scale thought small molecules, viruses, and cells to polymers with molecular weights in the millions of Daltons. While recognizing the difficulties faced in assembling an inventory the Panel did recognize that guidance would have to be provided to the survey participants and so identified a number of key characteristics participants should consider in determining whether to report a specific substance.

More specifically the Panel advised participants to consider:

- Stability and Soluble, not including labile nanomaterials (i.e., liposomes, nanosomes)
- Manufactured Intentionally excluding the universe of naturally occurring nanoscale materials and unintentional by-products
- Size and Shape including particles, rods & tubes with a size on the order of 1 nm and 100 nm recognizing that not all are expected in cosmetics

Based on these key characteristics a survey was sent to key committees and key members within the associations and an inventory was complied.

The Panel recognized that there were certain limitations to this approach. Firstly, by surveying key committees and key members some ingredients could be missed and so agreed to undertake a more extensive survey.

2. ICCR-2

The ICCR had their second annual meeting (ICCR-2) July 30-August 1, 2008 to discuss issues related to cosmetic products. As part of this meeting, the regulators entered into a dialogue with cosmetics' industry trade associations from each region.

The meeting focused on the following topics:

1. Good Manufacturing Practice (GMP)
2. Market Surveillance
3. Safety of Ingredients/Authorized Substances Lists
4. Sunscreens
5. Alternative Test Methods
6. Nanotechnology
7. INCI Nomenclature

A more detailed discussion of the priority items can be found in the Regulators report, "International Cooperation on Cosmetic Regulation; ICCR-2, August 2008, Meeting Summary" posted at ICCR member webs sites[3].

Specific to #6, Nanotechnology, the ICCR Regulators reported that "Industry provided a report focusing on a common definition for "Nanotechnology" that is relevant solely for cosmetic products and which describes characteristics of "Nanomaterials" useful for establishing an inventory of current applications in that area." ICCR regulators then

[3] FDA at http://www.fda.gov/oia/ICCR-2.htm; Health Canada at http://www.hc-sc.gc.ca/cps-spc/person/cosmet/info-ind-prof/iccr_result-2008-eng.php , MHLW at http://www.mhlw.go.jp/houdou/2008/08/j0814-1.html, and EU at http://ec.europa.eu/enterprise/cosmetics/doc/outcome_iccr_2008.pdf

requested that Industry provide information on the nanotechnology patterns of use survey to address:

(1) Product categories,

(2) Frequency of use of nanomaterials, and

(3) Additional safety testing being undertaken for nanomaterials and products containing them.

It was agreed that the manufacturing process would be taken into account. Further it was agreed that an ICCR Nanotechnology Working Group would be convened in the Fall 2008.

3. SCOPE:

The Panel undertook a more extensive Second Level Survey of all relevant members of each association reaching out to potentially thousands of companies. While those surveyed do represent vast majority of products sold worldwide, the Panel recognizes certain limitations of the survey. The survey, even greatly expanded, still only reaches Associations members and so does not include every cosmetic product, worldwide. As such, some advertised nanoscale ingredients reported as being used may not be included.

The Panel also wants to emphasis, as it has before, the inclusion of a material does not implicitly or explicitly suggest any safety conclusion on materials listed. The survey cannot be used as a surrogate for hazard identification; it contains no element of exposure analysis and so may not be used to draw any conclusions as to risk assessment.

Additionally, the materials listed include all that were "reported" to be Nanoscale. No confirmation was undertaken nor were the response subject to any extensive scrutiny. Thus it is not clear that these materials would meet the technical definition of a nanomaterial being advanced for regulatory purposes by a number of authorities worldwide[4].

[4] As examples: ANSI-NSP (American National Standards Institute); http://www.ansi.org ; ASTM (American Society for Testing and Materials): Committee E56; http://www.astm.org; ISO (International

It is now well understood that materials characterization is multifaceted and can be analysis dependent; a material reported to be nanoscale may be Nano in only one method of analysis[5], may only contain a minor fraction of nanoscale materials or may be nanoscale at only one stage of manufacture[6]. Thus the Panel wishes to emphasis that the inclusion of a material on the inventory does not suggest the material meets any specific "regulatory" definition of Nano, that may be adopted by any particular authorities, worldwide.

For these reasons Overall the panel is most sympathetic to FDA's reasoning in its Task Force report of July 2007:

> Moreover, while one definition for "nanotechnology," "nanoscale material," or a related term or concept may offer meaningful guidance in one context, that definition may be too narrow or broad to be of use in another. Accordingly, the Task Force does not recommend attempting to adopt formal, fixed definitions for such terms for regulatory purposes at this time[7].

Therefore the Panel wishes to emphasis that the key characteristics and materials reported were prepared within the scope of the ICCR program and should only be considered within the scope of the ICCR request to carry out a survey of relevant nanomaterials and can not be used as a surrogate for hazard identification and risk assessment.

Standards Organization): Technical Committee 229, at http://www.iso.org/iso/iso_technical_committee.html?commid=381983; and OECD (Organisation for Economic Cooperation and Development) http://www.oecd.org/sti/nano

[5] A Zinc Oxide particle may be reported to be 20 nm when measured using X-ray diffraction; 65 nm when measured by X-ray scattering and 120 nm when measured by Dynamic light scattering.

[6] In the manufacture of mineral sunscreens like Titanium Dioxide and Zinc Oxide starting materials are blended together inside a reactor vessel to produce crystals, typically of the order of tens of nanometers. However during the process of crystal formation, and while still inside the reactor vessel, the crystals spontaneously fuse together to form aggregates that are typically greater than 100 nanometres in size.

[7] US FDA Nanotechnology Task Force Report, "Nanotechnology: A Report of the U.S. Food and Drug Administration Nanotechnology Task Force", July 25, 2007

4. Results:

The results of the Second level survey, along with the data on product categories, and frequency of use of nanomaterials, requested by the ICCR Regulators, are now reported in Tables I, II and III.

The ICCR regulators also requested additional information on the safety testing of these materials used in cosmetic products. The Panel acknowledges the safety assessment of Nanomaterials does present challenges. However the safety assessment undertaken for personal care products containing nanoscale ingredients does not differ from the safety assessment undertaken for all ingredients and finished products. Existing information does not appear to indicate a need for revision to tests and the testing approaches currently used remain realistic. Established risk assessment methodologies can be used to build a framework to evaluate the current nanomaterials; however, this framework should be dynamic and revised as new safety data become available[8].

The Panel agrees there is a need to develop standard particle characterization methods[9]. Assessment of exposure risk requires careful evaluation of the composition of the nanomaterials, their physical and chemical properties, the potential for exposure, the magnitude of exposure, the conditions of exposure, and, if absorption proves to be significant, the route of exposure. However these are the same challenges faced by toxicologists face in the safety assessment of any materials and are not unique to the safety assessment of nanoscale materials.

5. Conclusion:

In conclusion the working group of the Canadian Cosmetic Toiletry and Fragrance Association, COLIPA, Japanese Cosmetic Industry Association and the US Personal Care Products Council is pleased to provide the ICCR members with these data. However the

[8] World Health Organization; "Environmental Health Criteria 235 DERMAL ABSORPTION"; 2006, found at http://www.inchem.org/documents/ehc/ehc/ehc235.pdf

[9] "ISO/IEC/NIST/OECD Workshop: FINAL REPORT June 2008", ISO, IEC, NIST and OECD International workshop on documentary standards for measurement and characterization for nanotechnologies; NIST, Gaithersburg, Maryland, USA, 26 – 28 February 2008 found at http://www.standardsinfo.net/info/livelink/fetch/2000/148478/7746082/assets/final_report.pdf

panel again wishes to remind ICCR members that the data were developed specifically for the survey and should not be applied overly broadly and in particular can not be used to implicitly, or explicitly, suggest any conclusion as to the safety of these materials. Finally the Panel fully believes that products must be safe (and effective where applicable) and strongly believes the risk assessment paradigms are robust enough to address nanoscale materials used in cosmetics: testing is reliable and current testing approaches remain realistic. The Panel does recognize that challenges remain, particularly in the area of materials characterization and is committed to continuing the dialogue within ICCR to assure consistent, science based regulation of cosmetic products.

TABLE I
Level 2 Survey
Inventory of Cosmetic Ingredients Reported as Being Nanomaterials

Materials – Alphabetical

1. Acrylates
2. Alumina
3. Carbon black
4. Cerium oxide
5. Colloidal gold
6. Fullerene
7. Iron Oxides
8. Micronized polyethylene
9. Platinum
10. Silica
11. Titanium Dioxide
12. Zinc oxide

TABLE II
Level 2 Survey
Inventory of Cosmetic Ingredients Reported as Being Nanomaterials

Materials – Frequency of Use[10]

High	*Medium*	*Limited Utilization*
• Silica • Titanium Dioxide • Zinc Oxide	• Alumina • Carbon black • Iron Oxides	• Acrylates • Cerium oxide • Colloidal gold • Fullerene • Micronized polyethylene • Platinum

[10] These assignments are based on the US FDA's Voluntary Cosmetic Registration Program (VCRP) program and frequency of use reported during the Level 2 survey. [The VCRP is an FDA post-market reporting system for use by manufacturers, packers, and distributors of cosmetic products that are in commercial distribution in the United States. A more complete discretion of the program may be found at the FDA web site (http://www.cfsan.fda.gov/~dms/cos-regn.html)] While reporting to the VCRP is voluntary the Panel believes the data are useful in determining the relative frequency of use and are therefore an accurate qualitative indication of frequency of use.. Limited Utilization indicates the substance had a single report (ie one company or zone).

TABLE III
Level 2 Survey
Inventory of Cosmetic Ingredients Reported as Being Nanomaterials

Product Categories[12]

Material	Bath	Oral Hygiene	Eye Makeup	Frag-rance	Hair Care	Makeup (not eye)	Man-icure	Skin Care	Sun Protection
Acrylates			xx			xx			
Alumina			xx	xx		xx	xx	xx	xx
Carbon Black			xx						
Cerium oxide									xx
Colloidal gold						xx			
Fullerene								xx	

[12] Product categories are defined in accordance with US FDA., "Cosmetic Product Category Codes" that may be found at http://www.cfsan.fda.gov/~dms/cos-reg2.html#catcode

TABLE III
Level 2 Survey
Inventory of Cosmetic Ingredients Reported as Being Nanomaterials (cont'd)

Material	Bath	Oral Hygiene	Eye Makeup	Frag-rance	Hair Care	Makeup (not eye)	Man-icure	Skin Care	Sun Protection
Iron Oxides			xx			xx	xx	xx	
Micronized poly-ethylene			xx	xx		xx			
Platinum								xx	
Silica	xx	xx	xx	xx	xx	xx		xx	xx
Titanium Dioxide			xx			xx			xx
Zinc Oxide						xx		xx	xx