

## **Submission on Nanotechnology to The Regulator, NICNAS**

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### **A Brief Outline of Concerns:**

The members of SACA are concerned that as nanoparticles have new and yet to be discovered characteristics and behaviour, the full facts are not yet known about how nanoparticles may behave in the environment, in living organisms, and in people. There is, however, early evidence that nanoparticles can migrate from soil and water into plant cells, and that carbon nanoparticles have caused neurological damage in fish.

Pollution of water by nanomaterials is not only likely, but probably inevitable. A study at the University of South Carolina documents raised mortality in copepods exposed to carbon nanotubes.(1) On the human scale, workers in China have recently suffered harm to their health from inhaling nanoparticles and one person has died as a result.

As much has still to be added to our knowledge of the behaviour and effects of nanomaterials, scientists and governments face the same situation as at the time of the release of ozone-damaging chlorofluorocarbons: that is, scientists do not know what effects to test for. An assumption of safety could lead to serious damage to the ecology of the biosphere and people's health.

As food growers, SACA members are concerned about the early evidence of possible harm to soil fertility from nanoparticles. As nanosilver is used to kill harmful bacteria, there is good reason, and some evidence, to believe that it may interfere with the complex ecology of beneficial soil organisms.

We are particularly concerned that the growing use of nanosilver as an antibacterial in clothing, washing machines and as a swimming pool disinfectant may eventually result in pollution of world water resources and the global water cycle.

Nano-pollution may follow the same route as that of DDT and other toxic chemicals, which are now in the rain clouds, the soil, and the

bodies of all creatures around the world, from fish to penguins to people. Decades after the release of particular chemicals it has been discovered, too late, that these chemicals are hormone-disruptors and pre-carcinogens.

The European Food Safety Authority has recognized the fact that the present lack of knowledge is dangerous, and has warned that reliable risk assessment of nanomaterials is not yet possible.

Despite the foregoing concerns, Australians are not protected and nanomaterials are making their way, unlabelled, into foods, drinks and consumer goods.

*Despite pressures from industry, nano-particles should not be released until the parameters have been thoroughly researched for their safe use, and this may take some years.*

Jim Thomas, an Oxford-based program officer with the technology watchdog ETC, writing in *The Ecologist* in February 2004, revealed that US and other regulatory agencies are "privately admitting they have made a mistake in letting nanoproducts onto the market without safety studies, and are looking for ways to tweak existing regulations"

According to Thomas: "Only a handful of toxicological studies exist on engineered nanoparticles, but not-so-tiny red flags are popping up everywhere."

A July 2004 ETC report\_says that governments on both sides of the Atlantic "reluctantly conceded that current safety and health regulations may not be adequate" for nanomaterials. "Ironically, they are talking about the need to be proactive, failing to admit that they are already at least one decade late: nanotech products are already commercially available and laboratory workers and consumers are already being exposed to nanoparticles that could pose serious risks to people and the environment."

**Precautions SACA members would like NICNAS to take:**

*Our preferred option is that NICNAS recognize the valid scientific concerns about nanomaterials, and declare a moratorium on new and existing nano-materials:*

***As a bare minimum, NICNAS should:***

*Close regulatory gaps that allow existing and new nano-materials to be released for sale and use without rigorous and prolonged testing.*

NICNAS should provide information for the public on the types and quantities of nano-materials used. *The known information, possible dangers, and precautions for using goods containing nanoparticles, including pharmaceutical goods, foods, drinks, glues, paints, cosmetics, cleaners, and chemicals must be made freely available.* This should be done through mandatory product labeling, data safety sheets and product web sites.

Any amount of nano-materials in goods should not be arbitrarily declared safe, as nobody knows the effect that these materials will have on body function, neurology, gene formation and expression, the developing foetus, or environmental systems.

Nano-materials should be defined as 'particles having one or more external dimensions measuring approximately 0.3 nanometres (nm) to 300 nm, or particles which have internal structures that exist at this scale'. This is crucial, as many particles that measure up to 300nm in size present health and environmental risks that are completely new to biology and ecosystems.

The definition proposed by NICNAS of <100nm is too narrow and will leave out many nanoparticles that pose new safety hazards. Nanotoxicologist Professor Ken Donaldson has told the UK House of Lords Inquiry into nanotechnologies and food that "there is no toxicological basis whatsoever" to limit the definition of nanoparticles to <100nm.

Nanoparticles that are clumped together as aggregates and agglomerates should also be classified as nanoparticles.

We are also concerned that nanoparticles should not be classified as insoluble. The solubility characteristics of nanoparticles are not yet understood. There is evidence that partially and even completely water soluble nanoparticles can be toxic.

Similarly, as the bio-persistence of nanoparticles has not yet been fully researched and is not yet properly understood, it must be recognized that particles that do not appear to be significantly bio-persistent may still be toxic.

So-called "business/corporate in-confidence" information should play no part in the regulation of nanomaterials. Risk assessment reports should be published in full and freely available. The public has a right to know the facts, so that people can avoid the use of products that may cause harm.

Two years after the NICNAS regulatory framework is initiated, a formal review must take place.

SACA members request that NICNAS should pursue mandatory regulation of nanomaterials, not only in the interests of the health of people and the environment, but also in the long-term interests of the industries that seek to use this new technology. The public, as well as people in SACA, are aware of the lessons to be learned from asbestos, chlorofluorocarbons, and bio-persistent chemicals that can wreak havoc on environmental and body systems in minute amounts.

The new science of epigenetics is showing us that seemingly insignificantly tiny amounts of chemicals may affect the genetic expression and health of generations down-line from those currently exposed. It is therefore the responsibility of NICNAS, industry, government and this generation to ensure that the mistakes of the past are not repeated in the case of nanomaterials.

Yours truly,

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#### References:

(1) Life-Cycle Effects of Single-Walled Carbon Nanotubes (SWNTs) on an Estuarine Meiobenthic Copepod<sup>†</sup>, Ryan C. Templeton,<sup>‡</sup> P. Lee Ferguson,<sup>§</sup> Kate M. Washburn, Wally A. Scrivens,<sup>§</sup> and G. Thomas Chandler\*

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