Dear NanoSafe Australia members,

Welcome to the very first NanoSafe Australia newsletter, which will provide information regarding the environmental health, safety and environmental issues surrounding nano-technologies. The content of each NanoSafe newsletter will include matters such as:

- Australian government activities and initiatives;
- NGO and international agency activities;
- A summary of key research papers;
- A summary of research activities in Australia; and
- A summary of funding opportunities.

As this is the first newsletter we will briefly and broadly cover what we see as important recent developments in the area of nanotoxicology. We would appreciate any contributions that members would like to make to future newsletters and we look forward to your active participation.

An overview of Australian activities

The NanoSafe Australia network will keep you informed of significant Australian government and industry activities in the field of nano-technology, focusing primarily on activities concerning health, safety and the environment.

National Nanotechnology Strategy Taskforce (NNSTF)

Recently, we received news that the report by the NNSTF has been submitted to the Minister for the Dept of Industry, Tourism and Resources (DITR), the Hon Ian Macfarlane MP. In the next 1-2 months the Minister will delivery a strategy that will form the nanotechnology policy for DITR and the Federal Government overall. Considering the aim of the strategy is "to best capture the benefits of nanotechnology for Australia *whilst safeguarding health, safety and the environment*", the announcement of the National Nanotechnology Strategy will be a key policy in determining the research directions of NanoSafe Australia's member groups. There is little doubt that environmental health and safety issues will feature in the report and we are all eagerly awaiting its release. You can look at the process of the NNSTF and what DITR is doing at their nanotechnologies website[1].

National Academies Forum (NAF)

In February 2006, the NNSTF commissioned the National Academies Forum (through the Australian Academy of Technological Sciences and Engineering), to investigate and report on the "Environmental, social, legal and ethical aspects of the development of nanotechnologies in Australia". A number of meetings were held in capital cities around Australia to discuss these issues and during April 2006 Paul Wright and Andrew Harford attended the Melbourne forum. These discussions were combined into a report for the NNSTF and were authored by Prof. Greg Tegart.

OH&S report by the Office of the Australian Safety and Compensation Council (ASCC).

The Office of the Australian Safety and Compensation Council (ASCC) has also had nanotechnology-related OH&S issues on their agenda for some time. This month the ASCC released a report focusing on OH&S issues for the nanotechnology industry and the document is available for download at the new ASCC website[2]. The report contains an excellent review of the toxicity of carbon nanotubes (CNTs), C_{60} fullerenes, metal-oxide nanopowders and quantum dots, as well as the potential for occupational exposure. It also highlights gaps in the knowledge that need to be filled for an appropriate risk assessment, so that workplace exposure standards can be established. It is an excellent document for anyone handling nanomaterials in the laboratory or industry and is recommended reading.

This report was co-written by Sam Bruschi and Steve Thomas for Flinders Consulting Pty Ltd, (a Flinders University company). It was reviewed by John Edwards, who is one of Australia's leading occupational hygienists and toxicologists, and a member of NanoSafe Australia network.

Standards Australia NT-001 project

Standards Australia recently formed a technical committee ("NT-001") to contribute to the International Organization for Standardization (ISO) project, TC229 "Nanotechnologies", which aims to provide international standards for the nanotechnology industry. TC229 consists of three working groups (WG), i.e.

- WG1 Terminology and Nomenclature,
- WG2 Metrology and Characterisation,
- WG3 Health, Safety and Environmental Aspects of Nanotechnologies.

The Chair and Secretary of the NT-001 committee attended the last TC229 meeting on the 21st-23rd of June in Japan. They returned with some interesting comments concerning the focus that Japan and the USA appear to have on the standardisation of carbon-based nanomaterials due to their substantial investment in these products.

NanoSafe Australia has been asked to contribute to the NT-001 committee and Andrew Harford has attended the its last two meetings in May and July 2006, while Brian Priestly also attended the May meeting. Subcommittees of NT-001 will be formed to reflect the three working groups and will be proposing new working items for the WGs. Andrew Harford will join the NT-001 subcommittee of WG3, chaired by Howard Morris from ASCC.

The TC229 survey **is now available (see attached)** – providing our groups with an important opportunity to suggest the standards for nanotechnology that will be significant to our research. The information collected in this survey will be used for prioritising work items and focusing on issues that require immediate attention. Although the survey is longer than expected, please take the time to consider what areas of standardisation are important to you and forward your responses by Sept 11 2006 to Andrew Harford (the NT-001 committee will discuss the survey results at the next meeting on the Sept 13). It is important to contribute a combined NanoSafe Australia viewpoint to the direction of the NT-001 and TC229 projects, as these will be influenced by the survey outcomes. If NanoSafe Australia members would like contribute further to the NT-001 committee, they should forward suggestions to Andrew Harford.

Key National and International Reports

All of you will probably be familiar with older key international documents, such as the Royal Society/Royal Academy of Engineering report[3], the UK Health and Safety Executive report[4], the PMSEIC report[5] and many others that have been published to date. Due to the large body of reports entering the literature, we will attempt to keep our members up to date. There will also be a list of key reports on the NanoSafe website once it is launched. We know many of you will have key reports that you are referencing, so please tell us if you have one that you would like highlighted. Some recently released reports, worthy of note, are listed below.

The Senate's Community Affairs References Committee[6] recently released their report, which investigated the health impacts of workplace exposure to toxic dusts. The senate committee was set up to focus on issues of asbestosis and related workplace diseases, however "*the potential of emerging technologies, including nanoparticles, to result in workplace related harm*" was added to their terms of reference and chapter 7 of the report is dedicated to nanotechnology. Of note in the report is the recommendation that NICNAS, the TGA and ASCC hold discussions to determine the appropriateness of current regulatory frame-works. There have been some suggestions that a new office similar to the Office of the Gene Technology Regulator (OGTR) may be established (or, more likely, OGTR may be adapted and renamed) to cater for all new technologies such as nanotechnologies.

The European Commission's Scientific Committee on Emerging and Newly Identified Health Risks[7] (SCENIHR) released a report in March this year. It had the informative title of "*The appropriateness of existing methodologies to assess the potential risks associated with*

engineered and adventitious products of nanotechnologies" and gave the opinion that traditional toxicological methods need to be modified to deal with nanotechnologies. As many reports have done in the past, this report identifies a number of gaps in present knowledge concerning issues surrounding health, safety and the environment.

The Woodrow Wilson Center's Project on Emerging Nanotechnologies[8] recently released their report titled "*Nanotechnology: A research strategy for addressing risk*", which was written by their chief scientific advisor, Andrew Maynard. This report moves towards addressing environmental health and safety issues by presenting a comprehensive framework for the risk assessment of nanomaterials. The document is critical of the past funding directed toward risk-based research and shows that the figures given by the US government concerning risk research spending are exaggerated. The author argues that a "top-down" approach is needed, where the federal agencies have a clear mandate for oversight and environmental, health and safety research for the nanotechnology industry. This is an important document because it clearly states what research needs to be conducted in the short, medium and long term and which agencies should take responsibility for that research. Furthermore, next month the White House will announce a nanotechnology health risk strategy, and we predict that many of the recommendations of this report will become the policy of the US administration.

NanoSafe Initiatives

NanoSafe logo

A logo for the NanoSafe Australia network has been designed by Andrew Harford, which appropriately symbolises the network. We welcome feedback from our NanoSafe Australia members.

NanoSafe Australia Website

We are current working on launching a website for NanoSafe Australia, which will serve as a public presence for our activities and also provide a forum for discussion within our group. It will consist of both public and member domains and provide general information to help industry, government and NGOs, who a trying to understand the health, safety and environmental issues concerning nanomaterials. Ideally the website format will include:

- Brief descriptions and contact details of NanoSafe Australia members & partners,
- Research project descriptions;
- Links to resources and key documents;
- Resources for members, i.e. reference lists and suppliers of specific needs; and
- Web-boards and/or blogs where discussions can take place.

Suggestions are welcomed from NanoSafe Australia members concerning the functionalities, information and features they would like to see used in the website.

NanoSafe projects

OHS position paper

One of the first initiatives of NanoSafe Australia is the production of a position paper concerning "Current OH&S best practices for the Australian nanotechnology industry". Our contact with industry representatives has shown that there is an immediate need for OH&S advice. Our groups also need this advice as many of us will be handling nanomaterials in the laboratory. The paper will include:

- A summary of current activities in Australian industry (based on a company list from Nanotechnology Victoria);
- Current Australian legislative framework for chemical regulation;
- Potential issues surrounding exposure to nanomaterials;
- Monitoring of nanomaterial exposure;
- Personal protective equipment (PPE) use;
- Disposal of nanomaterials; and
- Potential implications of bad practices.

The aim of this project is to produce a usable document to be readily applied by nanotechnology companies, which require immediate help with OH&S issues. A draft for comment will be made available in approximately one month, for a two week review period. The finalised document will be published in approximately two months. Suggestions and contributions for the article would be most welcomed at this stage and can be submitted to Andrew Harford.

White paper on nanotoxicology skills in Australia

With the announcement of Australia's Nanotechology Strategy just weeks away, it would be timely for NanoSafe Australia to produce a short paper that describes our nanotoxicology skills and what we have to offer in solving the issues of nanomaterial safety. This document would be presented to industry and government agencies to promote our network and position our groups in the right place for new funding opportunities. It is important that NanoSafe Australia members keep their nanotoxicology activities up to date by emailing the coordinator Paul Wright.

A survey of Australian materials scientists

Monash and RMIT Universities have produced a survey (**see attached**) that we hope you will circulate amongst Australian nanotechnology researchers who you know about within your institutions or industry. The survey aims to collate the nanomaterials being manufactured and studied in Australia, as well as the available knowledge concerning their physicochemical properties. In addition, we are asking for information concerning OH&S considerations for nanomaterials in each institution. It is important to note that this survey differs significantly from the TC229 survey because we are acquiring information on the materials, methods and OH&S practices ***currently being used*** by Australian nanotechnologists. The data collected from this survey will help NanoSafe Australia prioritise the nanomaterials needed to be studied, as well as identify suitable collaborators and find industry partners.

Laboratory Studies

Laboratory studies are moving ahead both at RMIT-University and CSIRO's Centre for Contaminants Research (CECR). Currently, both these programs are investigating the characterisation of various metal oxide nano-particles and effects of the media matrix on their agglomeration state. Links are being forged at RMIT and Monash between toxicologists and nanomaterials scientists for future research collaborations and very promising co-operative activities are being developed. Collaborations are ongoing with the Pacific National North-West Laboratories (PNNL, Richland, WA, USA), which is working on *in vitro* and *in vivo* dosimetry models to describe "particokinetic" characteristics.

NanoSafe Australia members list

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A/Prof. John Edwards, Dept Env. Health, Flinders Univ.

- **Dr Nico Volker** (biotechnology)
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Prof. Michael R. Moore, Director, Nat. Res. Centre for Env. Toxicology, "EnTox", Univ. of Queensland (UQ).

Dr Lidia Morawska, International Laboratory for Air Quality and Health (ILAQH), QUT.

Drs Graeme Batley & Mike McLaughlin (Co-directors, CSIRO Centre for Environmental Contaminants Research, CECR).

- **Dr Simon Apte,** CECR)
- **Dr Nicola Rogers** (CECR)
- **Dr Natasha Franklin** (CECR)

Prof. Brian Gulson (Head of "Isotopes in Health and the Environment Research Group", IHE, Macquarie University)

- **Dr Herbert Wong**

Prof. Colin Raston (Green Chemistry, University of WA)

Prof. Rod Minchin (Director of Toxicology, TetraQ, UQ)

URLs in this issue

1.http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectid=E2FE4F8A-4E44-4785-A6A01BE137E0E524&searchID=159869
2. http://www.ascc.gov.au
3. http://www.nanotec.org.uk/finalReport.htm
4. http://www.hse.gov.uk/horizons/nanotech/healtheffects.pdf
5. http://www.dest.gov.au/NR/rdonlyres/1E1B501A-727A-4153-85EF-134B2DAF0925/4112/nanotechnology_pmseic110305.pdf
6.http://www.aph.gov.au/Senate/committee/clac_ctte/toxic_dust/report/index.htm
7.http://www.ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_003b.pdf
8.http://www.nanotechproject.org/67/7-19-06-nanotechnology-a-research-strategy-for-addressing-risk