International POPs Elimination Network's Nanotechnology Working Group*

Brief background information on nanotechnology and nanomaterials

The Asia-Pacific workshop on nanomaterials organised in Beijing on November 27th by UNITAR and the OECD, is part of the Strategic Approach for International Chemical Management (SAICM) intercessional activities. SAICM's overall objective is to achieve the sound management of chemicals throughout their life-cycle, and covers environmental, economic, social, health and labour aspects of chemical safety, at all stages of their life-cycle, including in products.

What is 'nanotechnology' and how is it being used now?

The term 'nanotechnology' describes materials, systems and processes that exist or operate at the extremely small scale of a few hundred nanometres (nm) or less. To put a nanometre in context: a strand of DNA is 2.5nm wide, a red blood cell is 7,000 nm and a human hair is 80,000 nm wide. Nanoparticles are 'first generation' products of nanotechnology, extremely tiny particles used for their novel properties. Manufactured nanoparticles are already in hundreds of products including sunscreens, cosmetics, foods, food packaging, clothing, agrochemicals, industrial catalysts etc.

Uncertainty about nanotechnology; a lack of information sharing

There is huge uncertainty regarding the health impacts of nanoparticles. The toxicity of nanoparticles is affected by a range of factors including size and shape, chemical composition, and surface properties such as charge, area, reactivity, and any coating[1]. Different forms of nanoparticles of the same chemical composition can have very different toxicities. The uncertainty is made worse by industry's frequent failure to share information that does exist. Without mandatory labelling and registration of nano-products, no one, not even governments, knows which products contain nanoparticles. Surveys show that many companies do not conduct risk assessment[2]. There is also great uncertainty about social, economic, and legal issues including: liability, intellectual property, countries' right to reject nano-applications, the capacity to control nano-risks, etc.

Nanoparticles can present serious health and environmental risks

In vitro (test tube) and *in vivo* (on animals) studies have shown that manufactured nanoparticles, which are now in widespread commercial use including zinc, zinc oxide, silver, and titanium dioxide, pose new toxicity risks[3]. Nanoparticles could also cause long-term pathologies. Two separate studies published in 2008 found that certain carbon nanotubes cause asbestos-like pathogenicity and the onset of mesothelioma in test mice[4]. A small number of clinical studies suggest that nanoparticles and small microparticles that are not metabolised can over time result in granulomas, lesions, cancer or blood clots[5]. Some sectors of the public face greater risks than others, including workers who may experience routine occupational exposure to nanoparticles. There is also evidence that some nanoparticles can cross the placenta, posing particularly significant risks to developing embryos[6]. Some nanoparticles have been shown to have a potential for biomagnification and bioaccumulation in the environment[7].

High level scientists and risk assessors have called for precaution
The United Kingdom's Royal Society, the world's oldest scientific institution, has recommended that given the emerging evidence of serious nanotoxicity risks, nanoparticles should be subject to new safety assessments prior to their inclusion in consumer products[8], factories and research laboratories should treat nanoparticles with the presumption that they are hazardous[9], and the release of nanoparticles into the environment should be avoided as far as possible[10]. Swiss Re, one of the world's largest reinsurance agents, has warned that "the precautionary principle should be applied whatever the difficulties"[11]. Last year, the International Forum on Chemical Safety (IFCS)—in a resolution adopted by 71 governments, 12 international organisations and 39 NGOs—called for the precautionary principle to be applied in the management of nanotechnologies[12].

Most nanotechnology risks remain effectively unregulated
The overwhelming majority of nanoproducts are reaching the marketplace without being subject to any nanoparticle-specific safety assessment or with their safety assessed through inappropriate or incorrect testing protocols. The overwhelming majority of workers handling nanoparticles are not informed of this fact. No nano-containing products are required to be labelled. As uses continue to expand, the societal and environmental exposure to nanomaterials, both deliberate and unintentional, will inevitably also grow.

Nanosafety research is *significantly* behind product development and commercialisation.
Coordinated international efforts – such as the nanomaterials sponsorship programme under the OECD – focus on a fraction of the nanomaterials already in circulation or nearing commercialisation and are not expected to provide results that can assist risk assessment for some years.

Nanotechnology could intensify social and economic inequity
Technological developments in the 1990s failed to redress global socio-economic inequity; in fact, inequity increased in this period. Nanotechnology will do nothing to redress the systemic causes of poverty, hunger or pollution. Nanotechnology proponents predict that it will deliver breakthroughs in manufacturing, defence, medicine, energy, agriculture and communications, and that it will underpin the 'next industrial revolution'. Yet such breakthroughs appear unlikely to benefit the poor. Developing countries may also disproportionately bear nano-risks, by hosting manufacturing that wealthy countries reject, or becoming dumping grounds for waste.

Therefore, Civil Society groups call on Governments and industry to <u>apply the precautionary principle throughout the life cycle of manufactured nanomaterials</u>, as provided for in SAICM core documents by:

- Establishing a global governance process for nanomaterials that is transparent, inclusive, equitable and <u>driven by strong sustainability</u>,

- Adequately funding and conducting research on the human health and environmental risks of nanomaterials throughout their life cycle <u>before</u> nanomaterials can be sold commercially;

- Explicitly recognising consumers' and workers' <u>right to know</u> and <u>right to choose</u> in respect to nanotechnologies and nanomaterials;

- Explicitly recognising countries' rights to reject particular applications or uses of nanotechnologies and nanomaterials; and

- Adequately engaging all sectors of civil society for the establishment of coherent regulatory frameworks and research strategies.

In particular, in the critical field of information needs of countries, Civil Society groups call on governments to require producers of manufactured nanomaterials:

- To provide appropriate information allowing effective identification of all applications and products containing manufactured nanomaterials in order to inform governments as a basis for 1) effective, assessment and right to choose, 2) appropriate risk management measures, and 3) appropriate responses in case of health or environmental impacts identified post commercialisation; and

- To make this information available to citizens, by way of labelling and publicly available information registers, to allow for awareness raising, easier identification of products containing or made with manufactured nanomaterials and freedom of choice.

- To make this information available throughout the supply chain by all necessary means, providing adequate information to all workers and processors of manufactured nanomaterials to facilitate urgent regulation of nano related occupational health and safety risks.

**IPEN is a global network of more than 700 public interest non-governmental organizations working together in over 80 countries for a toxic free future. IPEN has established a nano-working group, which coordinates the actions and activities of public interest organizations around the world in the field of nanotechnologies and nanomaterials. Members include IPEN participating organizations such as the Center for International Environmental Law (CIEL), the National Toxic Network, the International Society of Doctors for the Environment (ISDE), Women in Europe for Common Future (WECF), the Island Sustainability alliance, BUND, Sciencecorps as well as a number of other organizations including Friends of the Earth Australia and US, and the ETC group*

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