



WORKING FOR A HEALTHY FUTURE



WP5 Health, Safety and Environmental (HSE) Impacts

Rob Aitken, Bryony Ross

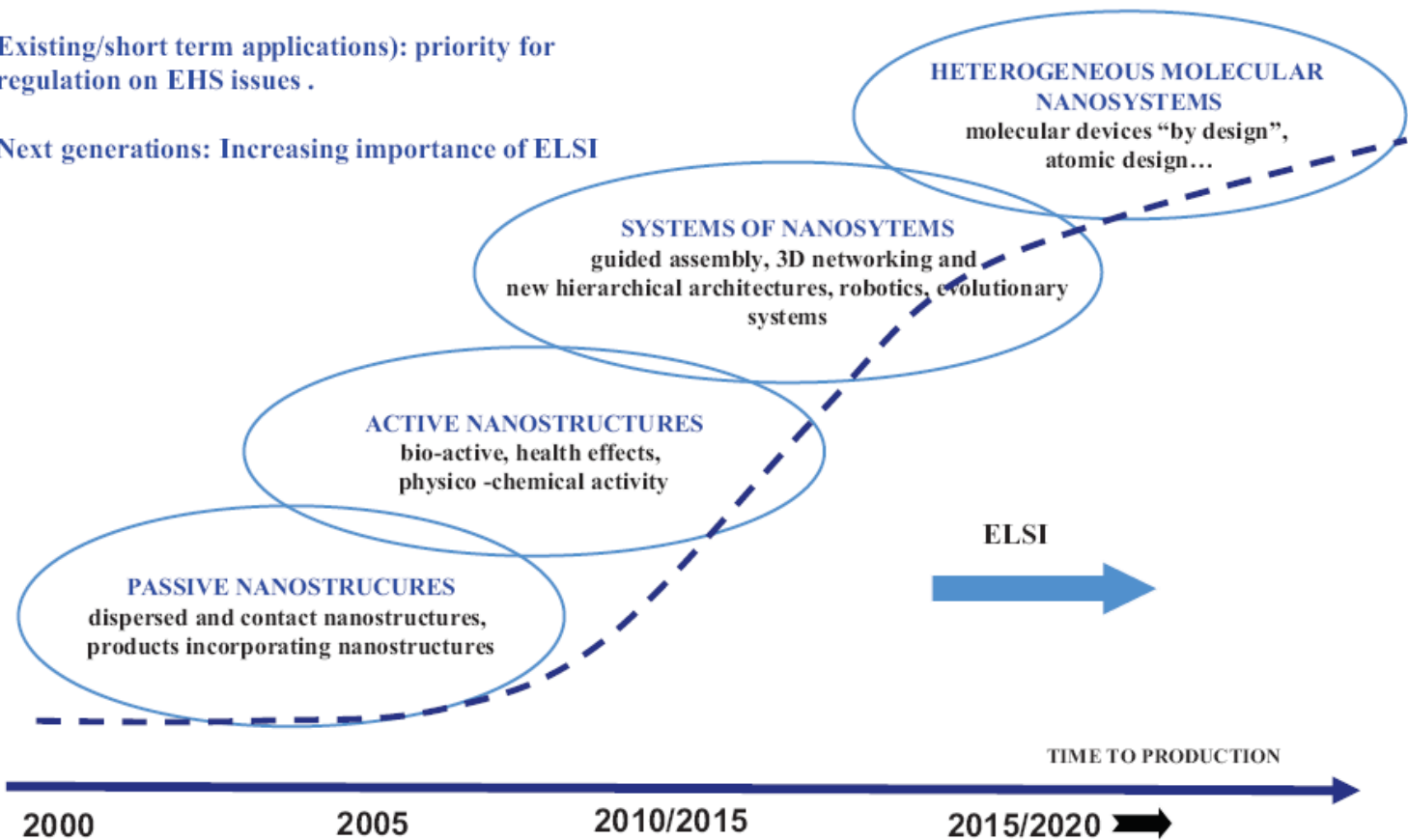
Director of Consulting, IOM

Director of SAFENANO

The “S” curve of nanotechnology...

Existing/short term applications): priority for regulation on EHS issues .

Next generations: Increasing importance of ELSI



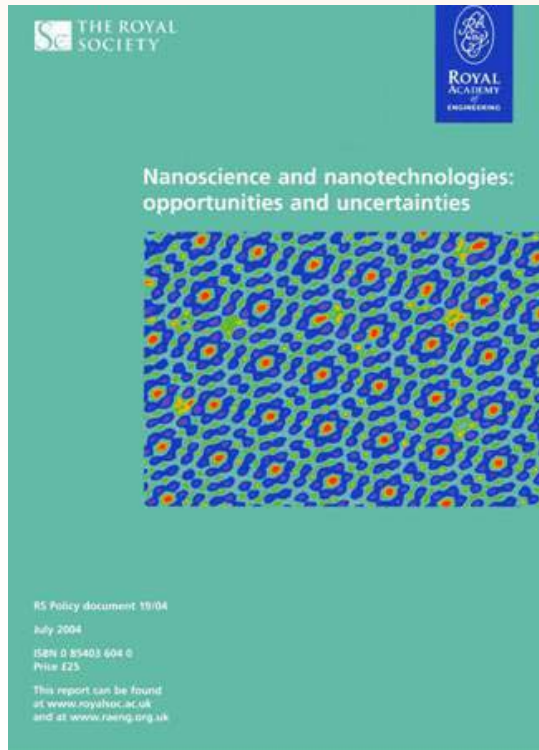
AIRI/Nanotec IT on data from M.C. Roco (NSF) and IRGC

Exposure to particles can cause health effects

Exposure to particles has health consequences

- Occupational
 - Asbestos, mesothelioma, lung cancer, asbestosis
 - Coal dust, pneumoconiosis
 - Silica, silicosis
- Environmental (PM10/PM2.5)
 - Exacerbation of heart disease, chronic lung disease, asthma
 - Acute increase in risk of death from heart attack, lung cancer

Nano & HSE – what are the issues? Royal Society Report 2004



- Many nanosciences and nanotechnologies are unlikely to present any risks to health and the environment....
- ...But for nanoparticles and nanotubes:
 - Properties at nanoscale are different
 - As particles get smaller, specific surface area gets larger linked to toxicity
 - Potential to translocate gets higher
 - Widespread usage means increased potential for exposure, people, environment
 - Not enough is known about exposure, toxicology and risk for adequate risk assessment

Outcomes from the review

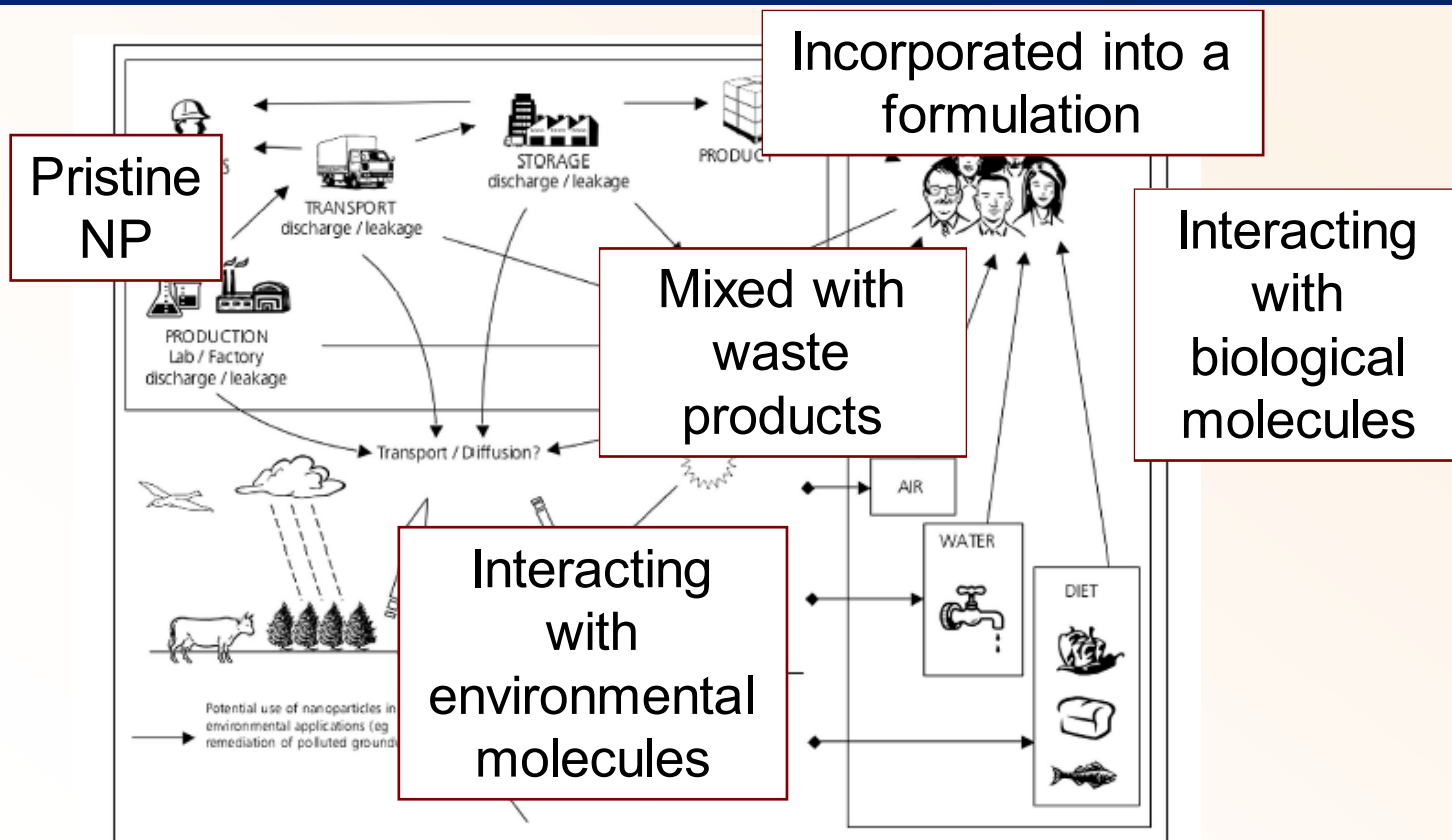
Lack of knowledge about:

- Hazard
 - Intrinsic harmfulness, toxicity, mechanisms, safe levels, best metric
- Exposure
 - Exposure pathways, who is exposed to what, at what levels, in what scenarios, best methods
- Risk
 - Likelihood of ill-health, environment
- Research needed to address these gaps
- Needs to be integrated and multi disciplinary

Toxicology issues

- **Surface area**
 - relates to inflammation which leads to disease – np will have much higher surface area per unit mass
- **Translocation**
 - Because of their size, nanoparticle can cross cell and other boundaries
- **Fibre analogy**
 - Asbestos fibres have high aspect ratios, are long and are highly biopersistent - so probably are some types of carbon nanotubes and nanowires
- **Solubility**
 - Some nps become more soluble as particle size decreases – this could imply increased bioavailability for particles previously considered insoluble or reduced particle inflammation effects
- **New properties**
 - Nanoparticles have new properties, that's why they make 'em – it would be surprising if the toxic potential was unchanged

What about exposure?



Exposure and risk issues

- Which industries processes and products
- How many people, at what levels, for how long
- What metric should we use, what size
- What else should we measure
- Are there methods available
- Are control methods effective

nano EH&S – its role in the Observatory



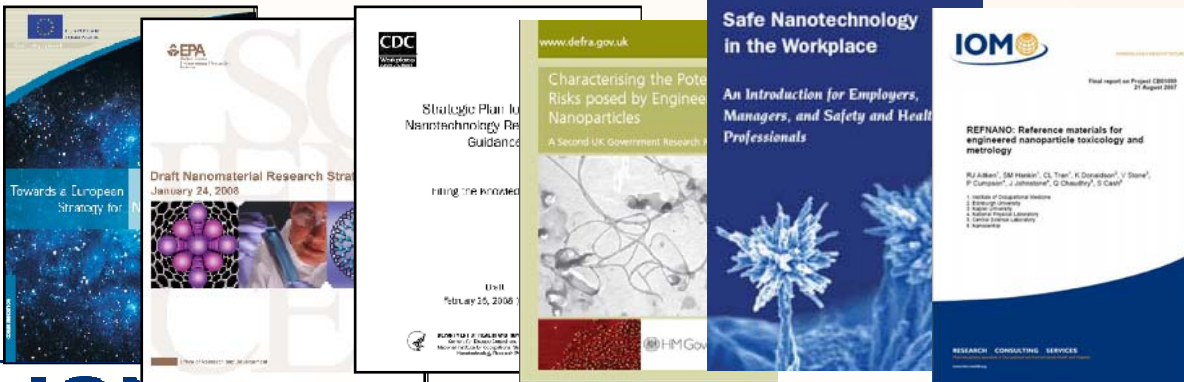
2004
RS/RAE Review

Explosion of activity
in nano E,H&S area

Increased awareness
of need for EH&S
research within Europe

IOM nano initiative
begins in earnest





2009: ObservatoryNANO
represents next stage
of the response,
offering an integrated
approach with an
applications focus.



and many more...



WP5 Partners

	IOM - UK	Lead, H,S,E
	RIVM - Holland	H,S,E
	CEA - France	H,S,E
	EMPA - Switzerland	E

IOM and nano



- Research, consultancy, training in occupational and environmental health, hygiene, risk
- Fully independent 1990 – no core or support funding
- Charitable status - not for profit
- 120 staff, Edinburgh HQ
- Mission – “For the benefit of those at work and in the community”
- Independent – Authoritative - Impartial



www.safenano.org

Particle_Risk



NanoImpactNet

NANOVICE

NanCore

ENRHES

NanoTEST

nanoIMMUNE

ObservatoryNANO

- Nanoparticles: An occupational hygiene review (HSE)
- A scoping study to identify hazard data needs for addressing the risks presented by nanoparticles and nanotubes (Defra)
- Refnano - Recommendations on key Reference Materials for nanotoxicology (Defra)
- Guide to Safe Handling & Disposal of Engineered Nanomaterials (BSI 6699-2)
- Cell Pen – Nanoparticle Translocation Review (Defra)
- HARN – High Aspect Ratio Nanoparticle Review (Defra)
- **EMERGNANO – Emerging Evidence Review (Defra)**



WP5 Activities

- External
 - Identify and liaison with other organisations
 - Analysis of outputs from other organisations
- Internal
 - Analysis of output from WP2 – Technology Sector Reports
- Deliverables:
 1. Prepare Liaison Plan
 2. Annual reports on Liaisons
 3. Annual EHS updates across thematic areas WP2
 4. Outline of Baseline Studies to be consulted In preparing (3)
 5. Outline documents summarising other existing observatories to assist in
preparation of (2)

Liaison Plan

- Identification of key liaison points within the following categories:
 - EU Funded Projects FP6, FP7 (e.g. FramingNano, ENRHES, NanoImpactNet)
 - Government and Quasi Government organisations (e.g. OECD, NATO)
 - Centres of Excellence (e.g. RICE, ICON, PEN etc.)
 - Other observatories (e.g. SAFENANO, CEA OMNT, KIR-Nano)
 - Others (e.g. Lux Research)
- For each, establish:
 - Named point of contact & contact email / tel. no.
 - Distribute pro-forma information / report request
 - Regular monitoring of activity via website

Year 1 Liaison Summary

- First version of Liaison Plan published February 2009
- Next steps: Continue to refine liaison approach throughout year
- Next Steps: Liaison summary
- Work ongoing on this

European Commission

ObservatoryNANO

Work Package 5, Health, Safety and Environment

ObservatoryNANO

Aut

ObservatoryNANO is a large scale project which aims to create an European observatory on nanotechnology to present evidence, consider and respond to science based and economic expert analysis across technology sectors, establish dialogue with decision makers and others regarding the benefits and opportunities, balance against the barriers and risks, and also them to take action to ensure that scientific and technological developments are realised as socio-economic benefits.

ICM leads Work Package Five (WPS) in this project: Health, Safety and Environmental Impact. Other partners in WPS are CEA, INMIL & EMPA.

The tasks under WPS may be split into two main parts:

1. Identification of a number of organisations or groups to establish liaisons with. Identify a list of the most productive methods by which to liaise with each, implement that liaison, review the outputs from these organisations, and summarise these outputs as annual reports.
2. Examine the scientific and technical outputs from the other parts of the observatory, assess whether there are any health, safety or environment implications of these and summarise these as annual reports.

The first deliverable under WPS is DEL 5.1 - a plan for liaison. This includes identification of with whom we will liaise, the kind of information to be gathered from each information source and how we plan to best communicate our data. The project consortium recognises that whilst this liaison plan has been produced for month 6 of the project, it will grow and develop during the lifespan of ObservatoryNANO and will be updated to reflect this when appropriate.

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Organisation	Project Contact	Resources Available	WPS partner to liaise	Liaison Process
CEL/NANOTOK	Ralf Kowalski	http://www.cel-nanotok.com	ICM	Establish liaison with co-ordinator. Make regular contacts for any updates. Check website regularly for updates.
ERTM	Aldwinke Gull	http://www.ertm.com	TRM	Establish liaison with co-ordinator. Make specific requests annually for any updates. Check website regularly for updates.
IMPART	Onaj Rivera	http://www.impart.com	ICM	This project is coming to a close. For months now available and will be held on request for subsequent updates.
NANONTRACT	Kathrin Chausse	http://www.nanontract.com	TRM	ICM are partners in this project and will provide updates.
NANOSH	Kai Beckmann	http://www.nanosh.com	TRM	ICM are partners in this project and will provide updates.
PARTEC-RISK	Luigi Tran	http://www.partec-risk.com	ICM	ICM are partners in this project and will provide updates.
NANOSAFE2	Pablo de Abajo & David Borch	www.nanosafe2.org	CEA	CEA are partners in this project and will provide updates.
NANOTRANSFORM	Chigian Wu	http://www.nanotransform.com	ICM	Establish liaison with co-ordinator. Make regular contacts for any updates. Check website regularly for updates.
NANOCAP	Patric Van Rossum	http://www.nanocap.com	TRM	ICM are partners in this project and will provide updates.
SAPHIS	Christophe Ouedrao	http://www.saphis.com	CEA	CEA are partners in this project and will provide updates.
NANOFABRIKIT	Michiel Deconinck Nathalie Bouchard	http://www.nanofabrik.com	CEA/ TRM	All partners are involved in updates will be regular.
NANOTEST	Maria Cristina	http://www.nanotest.com	ICM	ICM are partners in this project and will provide updates.
NANOSERVICE	Kai Beckmann	http://www.nanoservice.com	ICM	ICM are partners in this project and will provide updates.
NANOSCOPE	Bernj Packer	http://www.nanoscope.com	ICM	ICM are partners in this project and will provide updates.

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<http://www.observatory-nano.eu>

30.03.2009

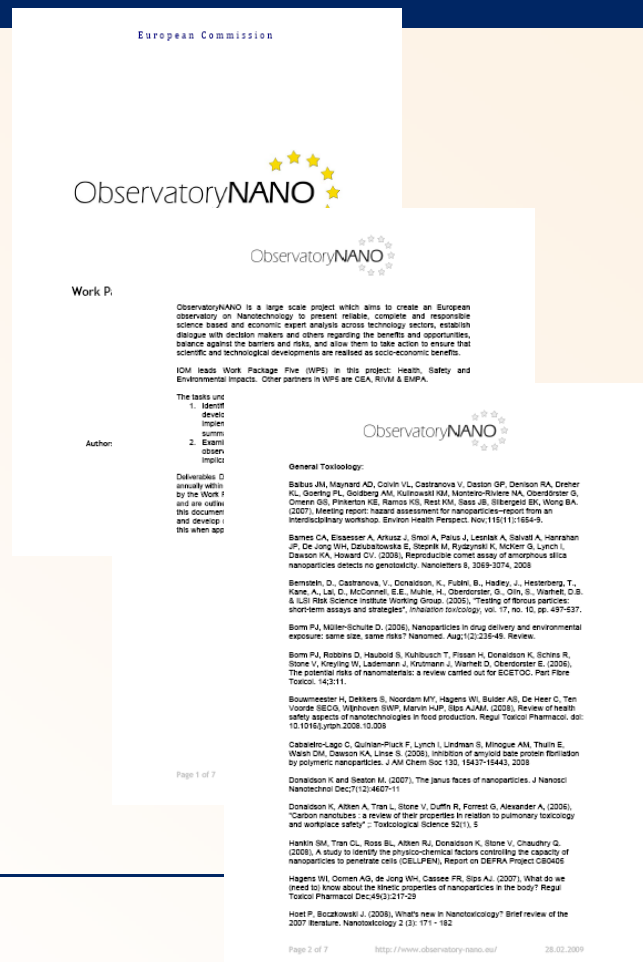


Technology Sector EHS reports

- Overview of the thematic area reports
 - Identify where there may be issues and what these are
 - Summarise what we know about them referencing the baseline studies
- To date:
 - Report format now agreed
 - Analysis of draft reports has commenced
 - EHS summaries to be prepared using a staged approach

First Annual Update: Supporting Actions

- **Baseline studies**
 - Identification of key reports
 - Categories - human tox, ecotox, exposure, fate & behaviour and risk assessment & management
 - First version of this document now published
 - **Next Step: Year 1 evaluation of studies included, and addition of new and relevant studies identified.**
- **Other Observatories**
 - Summary documents for SAFENANO, OMNT & KIR-Nano now complete & published



Thank you for your attention

rob.aitken@iom-world.org
bryony.ross@iom-world.org

www.safenano.org

