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ADVISORY COMMITTEE ON TOXIC SUBSTANCES

AN UPDATE ON THE POSITION CONCERNING THE HAZARDS ARISING FROM NANOTECHNOLOGIES AND APPROPRIATE CONTROLS

A Paper by Stewart McEwen – HSE Policy Group

Issue

1. Bud Hudspith of Unite has requested that a paper be put to ACTS setting out the position concerning the hazards arising from nanotechnologies and appropriate controls.

Timing

2. Routine.

Recommendation

3. ACTS is asked to consider and note the contents of the paper.

Background

4. As part of its horizon scanning activities HSE identified that some developing nanotechnologies may generate novel hazards. Around the same time the Government asked the Royal Society and the Royal Academy of Engineering (RS/RAEng) to carry out an independent study of likely developments in nanotechnology and whether it raises or is likely to raise new ethical, health and safety, environment or social issues which are not covered by current regulation. HSE worked closely with the study group whose report, entitled *Nanoscience and nanotechnologies: opportunities and uncertainties*¹ was published on 29 July 2004. The report stated that '[m]any nanotechnologies pose no new risks to health and almost all the concerns relate to the potential impacts of deliberately manufactured nanoparticles and nanotubes that are free rather than fixed to or within a material.'. This is still the case.

Argument

5. In March 2006 HSE published a report, entitled *Review of the adequacy of current regulatory regimes to secure effective regulation of nanoparticles created by nanotechnology: The regulations covered by HSE*². The report addressed two of the

¹ <http://www.nanotec.org.uk/finalReport.htm>

² <http://www.hse.gov.uk/horizons/nanotech/regulatoryreview.pdf>

RS/RAEng's recommendations (8 and 11). The overall conclusion reached was that the principles of the existing health and safety regulations and the interconnections between them are appropriate and applicable to nanomaterials. The authors perceived no need to fundamentally change the regulations themselves, nor to introduce new regulations. The report did identify issues which require attention if, for the foreseeable future the general regulatory framework is to operate effectively in relation to nanomaterials. HSE's nanotechnologies work programme (see Annex 1) was developed, and continues to develop, in close collaboration with other interested UK Government departments and agencies, the EU and other international organisations, e.g. OECD and ISO. The issues raised in the report on regulatory coverage and issues raised in other reports, e.g. the original RS/RAEng and from the Council for Science and Technology's (CST) report³ on the review of progress two years after the RS/RAEng report, are addressed in the various work programmes.

6. Before the RS/RAEng published its report HSE produced guidance aimed at researchers and developers creating and working with nanomaterials. It clearly states, to guide anybody undertaking a risk assessment related to nanotechnologies that, 'in the absence of any other evidence you should assume that the nanoparticle or fibre is at least as harmful as larger particles and may be more harmful.'
7. Research findings have recently been published⁴ which raise questions about the potential risks to human health and the environment arising from exposure to carbon nanotubes (CNTs). Long and thin, or high aspect ratio, CNTs can have similar dimensions to other mineral fibres, including asbestos, fuelling speculation that, if inhaled, they could cause lung cancer and other related diseases. The research was funded by The Colt Foundation which funds research projects in the field of occupational and environmental health, particularly those aimed at discovering the cause of illnesses arising from conditions in the workplace.
8. This is an important piece of research which provides valuable information on the cellular response to high aspect ratio CNTs, in this case one particular type of nanomaterial. It demonstrates that high aspect ratio CNTs present a potential health hazard. The research does not prove that CNTs will cause the diseases associated with asbestos. It shows that one step in the causal chain for mesothelioma (a form of cancer that affects the lining of the lungs and abdomen associated with exposure to asbestos) is the same as that for amosite. It also provides useful information for use in risk assessment and management.

Link to HSE Strategy

9. HSC's continuing aims:
 - protect people by providing information and advice, promoting and assuring a goalsetting system of regulation, undertaking and encouraging research and enforcing the law where necessary; and
 - influence organisations to embrace high standards of health and safety and to recognise the social and economic benefits.

³ http://www2.cst.gov.uk/cst/news/Files/nano_review.pdf

⁴ <http://www.nature.com/nnano/journal/vaop/ncurrent/abs/nnano.2008.111.html>

Consultation

10. The current work undertaken and resource provided by HSE for policy development and health and safety interventions are adequate to ensure the continued addressing of the issues raised by the various organisations tasked with watching that the Government is working to maintain and improve health and safety standards associated with nanotechnologies.

Action

11. Members are requested to note the information provided.

Contact

ACTS Secretariat

A snapshot of current HSE activity associated with nanotechnologies

New guidance aimed at manufacturers of carbon nanotubes

In the light of the recent CNT research findings HSE are drafting new guidance aimed at manufacturers of CNT. Currently in GB there is only one commercial manufacturer of the type of CNTs used in the research, ie multi-walled carbon nanotubes (MCNTs).

Regulatory coverage

HSE and others are attending the first meeting of the EC REACH/Nanotechnologies Group which is to consider how the issues surrounding the potential hazards of some nanomaterials can be addressed by means of the existing REACH framework.

Research

HSE is currently looking at hazard controls in university research facilities. This is part of the UK's contribution to NANOSH, a European Framework Programme 6 funded project.

Associated with this, HSE is addressing a meeting of the University Chemical Safety Forum on 8 July to discuss appropriate controls.

Standards

HSE has input into the recently published BSI documents covering health and safety issues, terminology and product labelling⁵.

Government

Lord McKenzie of Luton participates in the Ministerial Group on Nanotechnologies. HSE officials provide policy, scientific and technical input into the development of UK policy on nanotechnologies, thus ensuring the appropriate balance is made between innovation and worker and public health.

HSE

HSE has a multidisciplinary team working together closely and who meet regularly to discuss issues and develop the necessary inputs into the various national, European and Global fora currently considering the health and safety aspects of nanotechnologies.

⁵ <http://www.bsigroup.com/en/Standards-and-Publications/Industry-Sectors/Nanotechnologies/Nano-Downloads/>