June 2008

Nanotechnology Law Report

Legal Issues Surrounding Nanotechnology & General Nanotechnology News & Events

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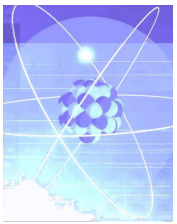
ANSI Publishes Series in NanoLawReport



The American National Standards Institute (ANSI) is at the leading edge of nanotechnology standardization and nomenclature development. ANSI has graciously agreed to publish a 4-5 part series on their efforts — as well as their work with/through the International Organization for Standardization (ISO) — in *Nanotechnology Law Report* starting in this edition. We are pleased to have ANSI's participation, which should be an effective way to increase our readers' awareness in the standardization process. We encourage readers to check back regularly for ANSI updates.

New Nano-Workplace Practices Study

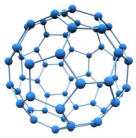
Nine researchers from the University of California, Santa Barbara conducted an international survey of nano-related workplace practices at nanomaterial firms and laboratories.

> *J. Conti, et al., "Health and Safety Practices in the Nanomaterials Workplace: Results from an International Survey," ENVIRONMENTAL SCIENCE & TECHNOLOGY, XXXX, xxx, 000-000 (forthcoming).*

The study was conducted June - December 2006. Of the 357 international invitees, 25 North American companies elected to participate. While the survey probably cannot be used to draw any firm conclusions, the most pertinent results for the North American participants follow:

Nano-specific workplace training: 22 respondents provided some type of formal nano-specific EHS training for workers. Engineering controls: Only 1 respondent did not use some type of engineering controls to limit possible workplace exposure to nanoscale materials, while 4 used fume hoods, and 20 used fume hoods plus some additional type of engineering controls. Personal protective equipment: 20 respondents required the use of PPE in the nano-workplace, 2 recommended its use, and only 3 made no PPE recommendations to workers. Gloves: 22 respondents required or recommended that workers wear safety gloves when handling nanoscale materials. Respirators: 11 respondents required workers to use respirators when handling nanoscale materials in the workplace, 3 required the use of both respirators and dust masks, 1 required the use of dust masks only, while 10 did not require the use of respirators or dust masks at all. Eye protection: 22 respondents recommended the use of eye protection to their workers using nanoscale materials, only 3 made no recommendation. Monitoring: 14 respondents monitored the workplace for ambient nanoparticles, while 11 did not. Disposal: 19 respondents disposed of "nanowastes" as hazardous materials, while 5 did not.

Fullerene Antimicrobial Environmental Study



Three Purdue researchers recently published the results of a study sponsored by the National Science Foundation regarding the potential environmental effects of fullerenes on microbial communities in wastewater digestor sludge.

L. Nyberg, et al., "Assessing the Impact of Nanomaterials on Anaerobic Microbial Communities," 42 ENVIRON SCI. TECHNOL. 6, at 1938-1943 (2008).

The researchers hypothesized that the release of fullerenes into wastewater discharge is likely to occur in real life as nanotechnology is commercialized. Further, because anaerobic sludge at wastewater treatment facilities contains a host of important living organisms, the group theorized that "microbial communities in anaerobic digestors are excellent sentinel communities for evaluation of the effects of" fullerenes.

The study measured methanogenesis [methane production] of sludge samples exposed to fullerenes for several weeks (up to 89 days). "Gas production data showed no toxicity due to any fullerene treatment. Nor was biodegradation of C60 indicated by an increase in gas formation."

Despite these positive results, the scientists cautioned that "[l]ong-term studies of microbial communities will be required to determine the overall environmental impact of fullerenes. The time frame for evolution of biodegradation of a new chemical in anaerobic systems may be particularly long, so it is too early to conclude that microbial ecosystems and biogeochemical cycles will be unaffected by C60."

Nano-Products v. EHS Data Lag

The Washington Post recently published an article "Safety Studies on Nanoparticles Lag Behind Technology." The article focuses on the apparent time lag between the use of certain nanoscale materials in consumer products and the publication of research regarding the potential EHS implications of possible human and environmental exposure.

The article takes aim at nanoscale silver's possible harmful effects on wastewater treatment facilities, fish and algae in waterways, and the use of sewage sludge containing nanoscale silver as fertilizer. Also receiving attention is the use of nanoscale metal oxides in sunscreens and the use of nanoscale iron particles in ground water remediation.

While the article draws no conclusions and advocates paying closer attention to these issues, it could have benefited from at least a quick look at some of the most recent studies in some of these areas. For example, researchers at Purdue University — which was interviewed for the article — recently published a study assuaging some of the initial fears surrounding the potential impact of fullerenes on anaerobic wastewater treatment sludge. (See above).

Regarding the time lag between nano-products and data, we are publishing an article in the next edition of *Risk Analysis* (a Journal of the Society for Risk Analysis) examining this issue. We will post a link to the article on our website when it hits the press:

"Nano Risk Governance: Current Developments and Future Perspectives," RISK ANALYSIS, Igor Linkov, F. Kyle Satterstrom, John C. Monica, Jr., Steffen Foss Hansen, and Thomas A. Davis.

UPDATE: NNI Reauthorization Passed by House

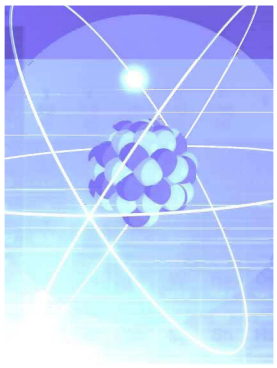
On June 5, the House, by a 407-6 vote, passed H.R. 5490: National Nanotechnology Initiative Amendments Act of 2008. The bill now heads to the Senate for its consideration and vote.

As reported earlier in the Committee Stage, "H.R. 5940, does not substantially alter NNI, but makes adjustments to some of the priorities of the program and strengthens one of the core components — environmental and safety research." There was 40 minutes of debate on the House floor, upon which the motion was called for and passed by a wide margin.

It would be interesting to learn why six Congressmen and women voted against it. If you are curious who those people are, the roll-call vote is at http://clerk.house.gov.

Setting Global Standards for Nanotechnology

As the nanotechnology industry evolves, the need for globally relevant standards – from particle properties and terminology to health, safety, and the environment – is becoming increasingly apparent. This article, the first in a series, introduces how the U.S. is influencing nano-related standards on the international scene.



The burgeoning nanotechnology industry has created a critical need for standards to support the cross-border trade of nano-related goods and services while also protecting the environment and the health and safety of consumers. These standards can only be set if there is active engagement by the same individuals and organizations that are working to advance the technology. Stakeholder insights and knowledge help to identify the priorities for standard-setting that will impact the widespread commercialization of nanotechnology and its influence in areas ranging from medicine to energy conservation.

The Building Blocks: Cross-Sector Coordination

In 2004, the American National Standards Institute (ANSI) formed its Nanotechnology Standards Panel (ANSI-NSP) in direct response to a request from the Office of Science and Technology Policy in the Executive Office of the President of the United States. This group serves as a cross-sector coordinating body that facilitates the development of standards in the area of nanotechnology. The Panel does not itself develop standards; rather, ANSI-NSP works with other national, regional, and international standards bodies, as well as industry, academic, and government stakeholders, to establish work plans, harmonize efforts, and mitigate duplication or overlap.

By soliciting participation from nanotechnology-related sectors and academia that have not traditionally participated in the voluntary standards system, the Panel provides opportunities for experts to identify and shape the specific needs to be addressed.

The next advancements came in 2005 and 2006, respectively, when the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) each formed Technical Committees (TCs) to create and promote the implementation of nanotechnology standards. As the official U.S. national body to ISO and, via the U.S. National Committee, the IEC, ANSI offers U.S. stakeholders a voice on the global stage.

IEC's TC 113, *Nanotechnology standardization for electrical and electronic products and systems*, focuses on relevant nanotechnological aspects in developing generic standards for electrical and electronic products and systems. This includes electronics, optics, magnetics and electromagnetics, electroacoustics, multimedia, telecommunication, and energy production. Dr. Thomas Chapin of Underwriters Laboratories represents the U.S. as chairman of TC 113, and the USNC-approved U.S. Technical Advisory Group (TAG) to TC 113 is administered by the National Electrical Manufacturers Association (NEMA).

A TAG develops national input on technical issues, submitting contributions on behalf of its constituents and responding to the contributions of other nations. Accordingly, delegations comprised of TAG members present these positions to ISO, where consensus agreements are reached.

Every member of a TAG has an equal voice, from industry giants to smaller organizations and institutions that focus specifically on the development of nanoscale materials.

Working with a broader perspective, ISO's TC 229, *Nanotechnologies*, develops standards that support the nanotechnology industry, specifically in the areas of terminology, nomenclature, measurement, and instrumentation. The Committee's scope of work also includes specifications for reference materials, test terminologies, modeling and simulation, and science-based health, safety, and environmental practices. Nearly thirty nations participate actively in the TC; nine additional countries monitor the work of the TC as observers.

The TC's technical activities are divided among four Working Groups* (WGs):

- WG 1, Terminology and nomenclature;
- WG 2, Measurement and characterization;
- WG 3, Health, Safety and Environment; and
- WG 4, Material specifications.

TC 229/WG 3, which deals with the development of science-based standards in the areas of health, safety, and environmental aspects of nanotechnologies, is convened by Steven Brown of Intel Corporation.

Across the board, the United States participates actively in the work of ISO/TC 229 and its subsidiary bodies.

National input is developed by U.S. TAG to ISO/TC 229, a group that is accredited and administered by ANSI. Working primarily via correspondence or meeting in-person as needed, the TAG reviews documents and position statements from other countries and formulates U.S. positions for consideration at meetings of ISO/TC 229 and its WGs. The TAG also provides information about ISO's standards development activities to the U.S. nanotechnology community, including stakeholders from the industry, government, academic, and standards and conformity assessment communities.

Call for Participation

Through the work of ANSI-NSP, participation in IEC TC 113 and ISO/TC 229 – via the respective U.S. TAGs – and leadership of the TC 229 WG on health, safety, and environmental aspects of nanotechnology, the U.S. is influencing how nanotechnology standards will shape the future of multiple industries across the world.

Interested parties are encouraged to join these efforts and participate actively in the groups of interest:

- For more information on ANSI-NSP, visit www.ansi.org/nsp.
- For more information on the U.S. TAG for ISO/TC 229, visit www.ansi.org/iscotc229tag.
- To participate in ANSI-NSP or join the U.S. TAG for ISO/TC 229, please contact Heather Benko (212.642.4912, hbenko@ansi.org).

**The work of ISO/TC 229 and its WGs will be explained in more detail during this series.*

TC 229/WG 3 Set to Publish Technical Report on Occupational Safety Practices

WG 3, the group within TC 229 that focuses on the health, safety, and environmental aspects of nanotechnology, finalized plans to publish a guidance document, *Health and safety practices in occupational settings relevant to nanotechnologies*.

"This Technical Report, which builds on NIOSH guidance, represents a major milestone toward responsible development of nanotechnology and is expected to be widely adopted as a foundation for national nanotechnology occupational safety and health programs around the world," said Vladimir Murashov, special assistant on nanotechnology to the director of the National Institute for Occupational Safety and Health (NIOSH), and the project leader for this initiative.

As nanotechnologies gain new commercial applications, issues of safety will continue to arise. However, as the report states, the occupational health and safety effects of new nanomaterials are mostly unknown. The report explores questions of the occupational safety and health risks raised by bringing nanomaterials into the workplace, and the international standards that are needed to address these issues.

Media Rips Carbon Nanotubes

There have been a number of articles published since May 20 regarding a possible link between carbon nanotubes and the development of precursors of mesothelioma resulting from a recent letter published in *Nature Nanotechnology*.

> *C. Poland, et al., "Carbon nanotubes introduced into the abdominal cavity of mice show asbestos-like pathology in a pilot study," NATURE NANOTECHNOLOGY, May 20, 2008.*

The letter's authors related the results of an *in vivo* study in which they injected various types of carbon nanotubes into the mesothelial abdominal lining of mice. The study

was driven, in part, because of prior speculation regarding an outward resemblance between certain carbon nanotubes and asbestos fibers, as well as prior studies showing possible adverse EHS effects from exposure to certain types of carbon nanoparticles under laboratory conditions. While not actually causing mesothelioma, the scientists "observed that long MWCNTs produced inflamation FBGCs and granulomas similar to the foreign body inflammatory response caused by long asbestos fibres." Of course, the mice did not actually inhale carbon

nanotubes (of any size) in the experiment, nor did the nanotubes end up in the chest cavity. The researchers further concluded that the "study does not address whether CNTs would be able to reach the mesothelium in sufficient numbers to cause mesothelioma following inhalation exposure."

To those judging whether media coverage of the issue has been "fair and balanced," below are some of the more notable articles we have come across since the Poland study was published:

"Are Nanotubes the Next Asbestos?;" "CANCER; Carbon Nanotubes That Look Like Asbestos, Behave Like Asbestos;" "Cancer concerns over carbon nanotubes;" "Cancer risk seen in nanotechnology;" "Tiny cylinders used in some products act like asbestos, a study finds;" "Carbon nanotube has similar effects to asbestos;" "Carbon nanotubes as bad as asbestos, says study;" "Carbon nanotubes behave like asbestos, study shows;" "Carbon Nanotubes Could Pose Health Risks Akin to Asbestos;" "Carbon nanotubes, key ingredient in nanotechnology work, mimic asbestos in mouse tests;" "Carbon nanotubes may be as hazardous to health as asbestos;" "Carbon nanotubes mimic asbestos in early study;" "Carbon nanotubes that look like asbestos just as cancerous;" "Comparison of Nanotubes to Asbestos Spurs Call for EPA, Hill Action;" "Effects of Nanotubes May Lead to Cancer, Study Says;" "Fears over wonder nanotubes;" "Health threat of nanotubes may be similar to asbestos, study warns;" "Hi-Tech Fibres Scare;" "How safe are nanoparticles?;" "In Study, Researchers Find Nanotubes May Pose Health Risks;" "Nano-fibres lead to pre-cancer symptoms in mice;" "Nanofibres linked to cancer;" "Nanotech could cause mesothelioma;" "Nanotubes could cause lung disease like asbestos;" "Nanotubes, Like Asbestos, Could Threaten Health;" "Nanotubes may cause cancer hazard;" "Nanotubes may pose risk that asbestos does, study reports;" "New cancer alert;" "New technology may be as bad as asbestos;" "Some nanotubes as dangerous as asbestos;" "Some nanotubes could cause cancer threat – study;" "Study Comparing Nanotubes, Asbestos Prompts Call for EPA Action;" "Study Finds Certain Nanotubes Could Be as Dangerous as Asbestos;" "Study links nanotubes to possible lung illness;" "Study: 'Nanotubes' Pose Same Danger as Asbestos;" "Study Seen Impacting Expected Cal/EPA Nanotechnology Bill;" "Study Waves Cautionary Flag About Nanotubes;" and "The microparticles that could pose the same risk as asbestos."

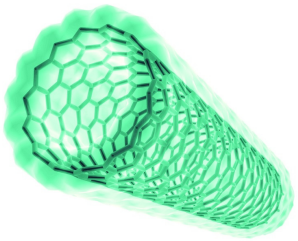
Some Legal Considerations Regarding the Carbon Nanotube Asbestos Analogy, Circa 2005

Given all of the press this past month regarding the Poland et al. letter in *Nature Nanotechnology* and the and Takagi et al. paper in the *Journal of Toxicology* — both of which discuss alleged "asbestos-like" effects of carbon nanotubes, we thought readers might be interested in an excerpt from our 2005 paper "Preparing for Future Health Litigation" published in *Nanotechnology Law & Business*.

Carbon nanotubes have already been compared to asbestos. The asbestos litigation crisis provides a useful case study to explain the importance of keeping products liability law in mind from the beginning of a product's life cycle to the end. The Rand Institute for Civil Justice has estimated that as of the end of 2002, approximately (i) 730,000 people had filed asbestos related lawsuits; (ii) 8,400 entities had been named as defendants in those lawsuits; and (iii) a total of approximately $70 billion had been spent defending those lawsuits and compensating those with alleged injuries. Of that $70 billion, approximately $21 billion was spent on actual defense costs, while another approximately $49 billion went to plaintiffs and their attorneys. (Approximately $19 billion went to the plaintiffs' attorneys, while $30 billion went to the actual claimants themselves). And it is not over: due to the decades-long latency period of alleged asbestos related diseases, most experts estimate that only 75 percent of the final number of asbestos claimants have come forward.

Asbestos litigation began in 1966 when Claude Tomplait filed the first asbestos products liability suit against 11 manufacturers of asbestos products after he was diagnosed with asbestosis. He lost his case,

but three years later, a coworker, Clarence Borel, sued and won nearly $80,000 from the manufacturers of asbestos products that purportedly caused him injury. The "asbestos litigation crisis" began in earnest in 1974 when attorney Steven Kazan filed, and ultimately won, a civil suit against the Johns-Manville Corporation on behalf of an employee who developed asbestosis after working in the company's Pittsburg, California plant for 29 years. In 1981, the California Supreme Court upheld an award of damages against Johns-Mansville – damages that would ordinarily be foreclosed due to the state's workers compensation laws. Specifically, attorney Kazan and his associates alleged that internal memoranda and letters showed that the manufacturers of asbestos had conspired to suppress knowledge of the hazardous effects of asbestos on human health as early as the 1930s."



In addition, as the body of scientific knowledge regarding negative alleged health consequences of asbestos exposure grew, trial lawyers sought out and found huge populations of workers and others that allegedly suffered significant occupational exposure to asbestos, despite having never worked in an asbestos factory. As time went on, asbestos litigation widened to include plaintiffs allegedly exposed to asbestos in construction jobs, power plants, oil refineries, shipyards and more. This "widening" trend continues to this day. According to the same Rand survey, claims by these workers have been increasing at a far greater pace than those by workers in "traditional" industries. (17% to 22% faster pace). In fact, the trial lawyers have begun a new strategy to further increase the number of asbestos claimants: suits on behalf of persons potentially exposed to asbestos, but who have not actually yet taken ill. It is unclear how the courts will come out on this issue.

The pattern of mass tort litigation showcased in the asbestos litigation has important implications for the nanotechnology industry. The pattern of lawsuits in the asbestos context may repeat in this area: first, those plaintiffs with the greatest and most direct exposure to nanotechnology products will sue. Then, after the trial lawyers have "skimmed the cream" off the top of the claimant pool, they will search for new theories of liabilities to allow more claimants to sue more and more corporations, including corporations very "remote" from the source of the alleged injury.

Asbestos litigation left nothing short of economic devastation in its wake for the companies that manufactured or otherwise used asbestos. While the trial lawyers argued that those companies who allegedly conspired to cover up the dangers associated with asbestos "deserved" to be bankrupted, it is also true that an even greater number of defendants who were only remotely involved in manufacturing the product met the same fate. Indeed, products liability is a strict liability cause of action, meaning that good intentions, lack of negligence, and best efforts are largely irrelevant. If a nanotech product is found to be defective and causes an injury to someone, the manufacturer and distributor of that product are presumptively liable.

DEFRA Voluntary Reporting

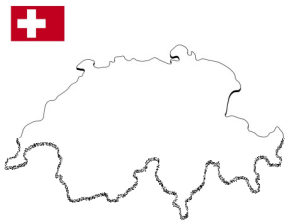
The United Kingdom's Department of Food, Environment, and Rural Affairs (DEFRA) has released its sixth quarterly report concerning the response to its Voluntary Reporting Scheme for Manufactured Nanomaterials (VRS). The news is not good.

The UK reports that no new submissions have been received by DEFRA since the last quarterly report in December 2007. Consequently, the count for total submissions remains at nine; seven from industry and two from academia. DEFRA is still seeking submissions under the VRS, but is recommending that the "objectives and data requirements for the scheme be more clearly articulated."

The stall in the submissions, albeit being light before, is not a good sign going forward for the program.

Additionally, there is concern that the lackluster response associated with the VRS is a harbinger of what is to come under U.S. EPA's Nanoscale Materials Stewardship Program. And while the concern is legitimate, we still think its too soon to paint them both with the same brush. EPA has received two submissions under the Basic Program, with a commitment from ten other companies. All of this in just the last four months.

Swiss Food Retailer's Code of Conduct



Switzerland's food retailers association, IG DHS, has released a Code of Conduct for food and packaging suppliers concerning the use of nanotechnology. The Code results from earlier criticism, and is aimed at avoiding similar public backlash, over the use of genetically modified food in Switzerland.

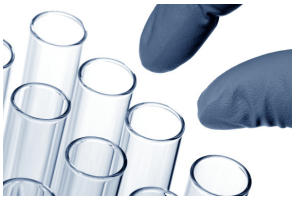
The two-page Code of Conduct states that "The lack of specific legal rulings for nanomaterials and the uncertainty associated with the assessment of their possible risks mean that the precautionary principle needs to be applied in order to protect the health of consumers and the environment from possible harmful effects. On the other hand, the numerous potential advantages and benefits offered by nanotechnologies need to be exploited in the best possible way. This document adopts the working definition cited in the basic report of the Swiss Action Plan on Synthetic Nanomaterials, according to which nanotechnology is concerned with structures between 1 and 100 nm that offer added functionality and are manufactured or manipulated in a targeted manner."

Specific obligations under the Code include procurement, product safety, and manufacturers and suppliers. The Code's largest impact appears to be the requirement placed on manufacturers and suppliers to submit detailed information regarding any nanomaterials used in their products. The Code requires the following minimum information from manufactures and suppliers:

- Benefit or added value of the "nano-product" compared to "conventional" versions of product;
- Evidence of the nano-specific effects and/or modes of action;
- Technical specifications (physical-chemical data, e.g. size, structure, etc.); and
- Risk potential for humans, animals, and the environment (toxicology, ecotoxicology, degradability, disposal, etc.)

While the requirements placed on suppliers seem to be detailed data submissions, the Code is contingent upon implementation by the signing IG DHS members ("The members of IG DHS are responsible for requesting information about nanotechnologies from their manufacturers and suppliers.").

Heads Up: REACH Open for Pre-Registrations



Anyone who makes or imports chemicals into the European Union (EU) should be aware that the new chemical registration program, REACH (somewhat analogous to TSCA registrations in the United States), is now open for pre-registrations.

The European Chemicals Agency (ECHA) opened the pre-registration process on June 1, 2008. Companies may pre-register chemicals until December 30, 2010. To find out if your company is required to submit pre-registration information to the ECHA, visit http://echa.europa.eu/pre-registration_en.asp (note that some chemicals have a December 1, 2008 deadline).

Submitters are advised to file their information early, as the ECHA expects close to 200,000 pre-registrations for the nearly 30,000 chemicals that REACH impacts.

REACH absolutely impacts nanomaterials that are produced or imported into the EU. So, if you or your company makes or imports nanomaterials into the EU, keep an eye on the target and deadlines.

Additionally, word has it that carbon and graphite are to be specifically included in the REACH submissions.

While the EU's instruction will cover all forms of carbon and graphite, it may particularly impact carbon nanotubes which have recently been compared to asbestos in the media.

Consequently, manufacturers and importers of carbon products, including carbon nanotubes, will have to submit full health and safety data in order to comply with REACH. Remember, though, the data does not have to be submitted for a year or so.

Once REACH gets rolling, however, we can expect to see more detailed data concerning the potential health impacts and concerns associated with nanotubes.

European Responsible Nano Code

After almost a year of study and comment, the Working Group of the European Responsible Nano Code released its Seven Principles of the Code and an accompanying series of Examples of Good Practice. The Responsible Nano Code is a partnership among the Royal Society, the Nanotechnology Knowledge Transfer Network, Insight Investment, and the Nanotechnology Industries Association who's goal is to "explore the societal and economic impact of the technical, social and commercial uncertainties related to nanotechnologies."

The Seven Principles, broadly speaking are:

Principle 1 – Board Accountability: "Each Organisation should ensure that responsibility for guiding and managing its involvement with nanotechnologies resides with the Board or governing body."

Principle 2 – Stakeholder Involvement: "Each Organisation should proactively engage with its stakeholders and be responsive to their views in its development or use of products using nanotechnologies."

Principle 3 – Worker Health and Safety: "Each Organisation should identify and minimise sources of risk for workers handling products using nanotechnologies, at all stages in the production process or in industrial use, to ensure high standards of occupational health and safety."

Principle 4 – Public Health, Safety and Environmental Risks: "Each Organisation should carry out thorough risk assessments and minimise any potential public health, safety and environmental risks relating to its products using nanotechnologies."

Principle 5 – Social and Ethical Implications and Impacts: "Each Organisation should consider and respond to any social and ethical implications and impacts in the development or sale of products using nanotechnologies."

Principle 6 – Responsible Sales and Marketing: "Each Organisation should adopt responsible practice in the sales and marketing of products using nanotechnologies."

Principle 7 – Engagement with Suppliers: "Each Organisation should engage with suppliers and/or business partners to encourage and stimulate their adoption of the Code and so assure its own ability to fulfil its Code commitments."

Notably, the Code is a principles-based agreement, rather than a standards-based agreement, and "would be developed through a process of engagement between a representative group of businesses from various stages of different supply chains and a wide range of stakeholders, including NGOs, government and consumer groups."

GAO Report on Nanotech Guidance

The Government Accountability Office (GAO) recently released a report entitled "Nanotechnology: Better Guidance Is Needed to Ensure Accurate Reporting of Federal Research Focused on Environmental, Health, and Safety Risks."

The report made several observations and conclusions, including:

- $37.7 million dollars, or 3% of the federally allocated $1.3 billion for nanotechnology research, is focused on potential EHS risks;
- Of the 119 research projects claiming to focus on EHS risks, GAO determined that 22 projects, or 20%, did not, in fact, focus on EHS risks. Instead, these projects were environmental remediation or hazard identification focused, and the mischaracterization was due to flaws in the classification process (as an aside, GAO conducted a follow-up study to this point, and released a subsequent report in late April entitled: "NANOTECHNOLOGY Accuracy of Data on Federally Funded Environmental, Health, and Safety Research Could Be Improved;"
- EHS research projects conducted in 2006 were "generally consistent" with agency goals;
- Federal agency and NNI efforts to coordinate research activities related to EHS risks "have been generally effective."

GAO also recommended that the Office of Science and Technology Policy (OSTP), the office that administers the NNI, provide better guidance to agencies regarding how to report research that is primarily focused on EHS risks. In commenting on a draft of this report, OSTP generally agreed with the findings and will review the manner in which agencies respond to current guidance.

Spanning the Data Gap: A Marathon or Sprint?

Our friends at Nanowerk recently pointed out the problems with the length of time in publishing the results of scientific studies in relation to the freshness of the data. Without repeating their well written piece, there are some particularly interesting points, such as:

- A peer-reviewed paper takes almost two years to publish once the scientific research is completed; and
- In a fast-growing field like nanotechnology, the knowledge contained within the field doubles roughly every five years ("knowledge" is not defined).

This raises the fairly obvious problem that the published results of research may very well be outdated and stale by the time the research paper is in circulation.

Clearly, the delay from research to publication is a problem. As we have previously reported, the "data gap" that exists is one of, if not the, major barrier to nanotechnology regulation and addressing the health and safety issues that are at the front of everyone's mind. But how to get the fast-paced information out faster? One of Nanowerk's suggestions is a wiki, which we have previously reported and which ICON is proposing be used for "good practices" development. Maybe this format will work for peer-reviewed research as well.

Nanosoccer, Sure. But How Big is the Trophy?

The National Institute of Standards and Technology (NIST) is hosting a nanosoccer tournament, of sorts.

The soccer tournament is meant to encourage nanoscale research on motion and movement: "NIST's conducts its nanosoccer competitions and demonstrations in conjunction with RoboCup, an international organization dedicated to using the game of soccer as a testing ground for the robotics technologies of the future. NIST's goal in coordinating competitions between the world's smallest robots — known as nanobots (nanoscale robots) — is to show the feasibility and accessibility of technologies for fabricating MicroElectroMechanical Systems (MEMS), tiny mechanical devices built onto semiconductor chips and measured in micrometers (millionth of a meter)."

The most recent demonstration occurred at the Carnegie Science Center in Pittsburgh. While detailed data from this demonstration does not appear to be available, readers should look at their website to see what they did at the 2007 demonstration. Other highlights include the demonstration video "Bend it like NIST: Tiny Soccer Players Pave Way for Microrobots."

We just have a few questions. First, do they play with buckyballs? Second, how big can the trophy really be? And third, are these guys available for our upcoming soccer tournament this summer? We can use all the help we can get.

Department of Defense Watching Nanomaterials for Possible EHS Risks

The acting Secretary of Acquisition, Technology and Logistics for the Department of Defense recently circulated an internal DoD memorandum reminding military science and technology managers, acquisition program managers, and EHS professionals about the possible EHS risks accompanying the use of some nanoscale materials in certain settings. Although the Secretary acknowledged that insufficient science exists to draw any broad conclusions about nano-related EHS issues, he advised recipients to "exercise due diligence" when working with or acquiring nanoscale materials. The memorandum also directs recipients to support EHS "research to close information gaps in developmental efforts using nanomaterials," and to ensure that EHS "hazards are identified and the associated risks managed pursuant" to existing military standards and DoD policy requirements. Finally, recipients were also directed to "maintain current knowledge of [the EHS] risks for engineered nanomaterials" and follow relevant standard military risk management options when using nanoscale materials.

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