Legal Backgrounder

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NANOTECHNOLOGY:
DON'T DELAY LIABILITY RISK ASSESSMENTS AND SOLUTIONS

by

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Asbestos, PCBs and other "wonder" products were once hailed for their benefits. Decades later, the claims for environmental cleanup and for personal injuries are enormous. For asbestos alone, experts estimate that pending and already-paid claims will cost industry $265 billion. Already, these claims and payments have contributed to the bankruptcy of over 70 companies. For the plaintiffs' bar and environmental activists, pursuing these companies has been a cottage industry.

The same excitement that surrounded the introduction of asbestos and PCBs now surrounds the introduction of nanotechnology. Yet, once again, some scientists are issuing warnings about potential environmental and health impacts – warnings that are eerily similar to earlier questions about asbestos and PCBs. If the past could be prologue, is it time to consider some type of nanotechnology liability protection plan?

What is Nanotechnology and What is the Issue?

Nanotechnology involves creating or improving products by manipulating molecules and atoms. The U.S. National Nanotechnology Initiative defined nanotechnology as using matter sized "at dimensions of roughly 1 to 100 nanometers." One nanometer is one billionth of a meter, about a thousand times smaller than a red blood cell. A single human hair is 80,000 nanometers wide.

Society is already seeing the benefits of nanotechnology as nanoparticles are incorporated into a broad spectrum of products to improve their performance. For example, nanotechnology is now being used in electronic products, pharmaceutical products, medical equipment, cameras, sunscreens, razor blades, clothing, product coatings, cosmetics, sports equipment, car products, and food packaging. Nanosized particles have been developed which decrease diesel fuel emissions. Other nanoparticles make hazardous waste cleanups more effective by removing contaminants from soil and groundwater. Pants, made stain resistant by nanoparticles, are being marketed. Some car manufacturers are using

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nanotechnology to make exterior plastic parts and paint more durable. Carbon nanotubes, an elongated nanoproduct, are valued because they are among the strongest materials known to exist.

Altogether, nanotechnology is used in about 700 products manufactured at about 800 facilities in the U.S. alone. It is estimated that $32 billion in products containing nanomaterials were sold in 2005. According to the National Science Foundation, global sales of nanomaterials could exceed $1 trillion within ten years. Some observers place that number at over $2.5 trillion.

Looking toward the future, hundreds of research projects are underway. In the agriculture sector alone, there is extensive research into using nanotechnology for food packaging and pathogen suppression. Research on reducing agricultural waste and runoff also shows promise. Some experts see a nanotech food market of $20 billion in the next four years. In the energy sector, researchers are exploring nanofluids which improve heat transfer rates, thereby improving the efficiency of home water heaters and central heating systems. Other researches have developed nanobased filtration membranes that might curb harmful power plant emissions.

Although nanotechnology is ripe with promise and potential, some researchers are raising cautionary flags, finding that nanoparticles, because of their size and configuration, may behave differently than larger particles of the same substance. For example, in September 21, 2006 testimony before the House of Representatives' Committee on Science, representatives of the National Science Foundation noted that gold is a well known, oft used inert substance. But, on a nanoscale, gold behaves differently. Its color changes to a striking red, and under certain circumstances, it may be very reactive, may penetrate the brain/blood barrier, and may enter cells. On the other hand, the Environmental Protection Agency recently reviewed fifteen chemicals produced on a nanoscale and found that only one had unique properties causing it to act differently than the larger form of the same chemical. However, certain nanoparticles are specially engineered and have no bulk equivalent.

Some laboratory studies have shown certain carbon-based nanomaterials cause inflammation and damage kidneys, livers and spleens in lab animals. Sometimes the damage was fatal. Agricultural researchers found some nanoparticles can stunt plant growth and cause cells to die. Other researchers have found that chemicals in sunscreens biologically accumulate in fish and questions are now being raised as to whether nanoparticles in sunscreens which increase the absorption rate also increase bioaccumulation rates. Some researchers say the minute size of nanoparticles makes it easier for those particles to penetrate cells and to evade host defenses. Other researchers suggest the nanomaterial itself may be benign but, given its size and configuration, may catalyze other chemical reactions which may be harmful.

While these studies do not prove that problems exist, they suggest the possibility. Largely because of that possibility, everyone agrees we need to know more about the behavior and effects of nanoparticles. Because of the uncertainty about the effect of nanoparticles, there is a steadily rising chorus of calls for more research. In 2003, the Nanotechnology Environmental and Health Implications Working Group was established within the Federal government. The National Science Foundation is spending about $25 million annually to assess the environmental health and safety implications of nanotechnology. As more research dollars are spent, and as time passes, the answers about whether nanotechnology presents environmental or health concerns will come. However, some groups have already concluded that nanoparticles may be a threat. In 2006, Friends of the Earth called for a ban on the use of nanoparticles in sunscreens, calling the purchasers of these products human guinea pigs.

Although no one can predict the future, the April 8, 2006 edition of *The Washington Post*

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contained an article by a reporter who toured a nanotechnology plant to observe production methods. The *Post* reported that from a production standpoint the future looks much like the past. Workers were seen walking atop two-story spray and drying machines while forklift operators and other workers wrestled 55-gallon chemical drums into place. Workers with face masks were reported to be covered by a film of dust.

If studies ultimately find adverse environmental and health impacts from some or all applications of nanotechnology, fixing the problem will not be easy, or inexpensive. Nanoparticles, once in the environment, will prove very difficult to remove because of their size and durability, particularly if they enter and accumulate in the human body. If nanoparticles become the next asbestos or PCB-like crisis, the cost to industry will be huge. In fact, some observers are already pointing to decisions by smaller companies, and even some larger companies, to not pursue nanotechnology because these companies do not want to be exposed to nanotech liability if potential risks become actual problems. Other companies have been reluctant to pursue nanotechnology because they lack the resources to undertake expensive toxicity and safety tests, without which they fear they cannot guard against potential liabilities.

Is it Time to Consider a Nanotechnology Liability Protection Plan?

The answer to feared or actual problems with nanotechnology is not to run away from this most promising technology. One solution is to adapt existing regulatory programs or to create appropriate new ones.[1] But, for companies confronting asbestos like liability for past actions, that may be akin to the proverbial closing of the barn door after the horses have escaped.

Given our past experience with "wonder products," it may also be appropriate to learn from that past and to consider the creation of a Nanotechnology Insurance Fund ("NIF"). The two principal purposes of an NIF would be to 1) provide an exclusive source of compensation for people such as consumers or workers who claim, and can prove, injury from nanoparticles and 2) pay for any required environmental cleanup and restoration costs. A secondary purpose of the NIF could be to undertake nanotechnology research to determine if there are, in fact, adverse effects from nanoparticles and, if so, whether those particles can be engineered to eliminate or reduce such effects.

Revenue sources for the NIF could include a consumer-paid surcharge on the sales price of products with nanoparticles, a fee assessed on producers and sellers of nanotechnology, and/or congressional appropriations. Payment of any such fees by industry could be voluntary or mandatory, but companies contributing to the NIF would receive limited or complete liability protection from injury claims and from environmental cleanup costs. If a limited rather than complete liability program is appropriate, the program could also be structured using standard insurance models in which companies pay higher rates to have lower deductibles.

The NIF could sunset after a specific number of years so that Congress and the affected parties could, at a time certain, determine if there is a reason to continue the program based on then current

[1]Whether existing statutory and regulatory mechanisms are adequate is beyond the scope of this article. Already there is a significant debate about whether nanoparticles are a new substance subject to review under the Toxic Substances Control Act. Commentators are also debating whether and how laws such as the Comprehensive Environmental Response, Compensation and Liability Act; Resource Conservation and Recovery Act; Clean Water Act; Clean Air Act; Occupational Safety and Health Act; and Federal Food, Drug, and Cosmetic Act apply to the production, distribution, use, discharge, disposal and clean-up of nanoparticles and products containing nanoparticles.

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research and experience. If the NIF is discontinued, companies paying into the NIF could have their payments returned minus any administrative and research costs.

No one in corporate America is eager to incur new and unnecessary costs. But anyone who has been part of, or witness to, the asbestos and PCB wars should think twice about whether what happened there is a preferable outcome to developing some type of pre-emptive liability and insurance program.

If a pre-emptive insurance program is the proper course of action, it need not necessarily be a Federal program. It may be better implemented as an initiative undertaken by the private insurance sector, perhaps with appropriate federal insurance guarantees as a safety valve.

Regardless of whether an NIF, or a similar concept, has merit, surely there is a better solution to potential nanotechnology liability problems than years of tedious and expensive litigation followed by large and bankrupting settlements or judgments.

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