By
Kevin M. Haas

Nanotechnology: Risks and Rewards

Insurers must keep liability at bay even in the miniature worlds of tomorrow.

Nanoparticles' small size makes them difficult to detect and a challenge to remove from the environment.

The blossoming field of nanotechnology engages scientists at the smallest of scales—the nanoscale, where matter is measured from one- to one-hundred-billionth of a meter. At nanoscale, a substance's physical and chemical properties are altered, presenting both the promise of beneficial use and the peril of unknown risk.

Nanotechnology holds great promise to reduce emissions and provide new techniques for environmental remediation. However, there are real risks that certain nanomaterials may harm the environment. Government, business and science must each ensure that these risks are minimized as nanotechnology advances. Insurers will play a key role in fostering business innovation secured by risk management.

Highly efficient nanoscale-level sensors will be able to detect harmful substances in the environment and ensure better air and water quality by testing particulates more precisely. These sensors also will help detect minute levels of biological or chemical warfare agents in aquifers and the atmosphere.

Nanomaterials are lighter and stronger, fostering design of more fuel-efficient airplanes and hybrid cars to reduce energy consumption. Other nanomaterials may serve as next-generation fuel additives, decreasing gasoline consumption and emissions. Power lines made with carbon nanotubes will carry more electricity at greater speeds. Photovoltaic cells comprised of quantum dots will produce solar energy more efficiently.

Nanotechnology also promises to greatly enhance water quality by improving filtration and advancing desalinization. Nanoscale titanium dioxide has been found to neutralize water-borne bacteria, including E. coli. Nanoscale iron particles counteract dense nonaqueous-phase liquid in groundwater, a time-consuming and costly form of contamination to remediate. Other nanoscale substances have had beneficial impact on arsenic, lead and chromium. Nanotechnology also may offer much less expensive *in situ* remediation options, compared to current removal and off-site treatments.

Despite their great promise, nanomaterials present risks that must be carefully studied. Nanoparticles' small size makes them difficult to detect and a challenge to remove from the environment. Certain carbon-based nanomaterials share qualities with earlier substances such as DDT and PCBs—they may bioaccumulate, persist in the environment and work their way up the food chain. Like their molecular forefathers, hazardous nanomaterials may biodegrade into even more toxic by-products. These risks are heightened by the ease with which nanoparticles are so easily ingested by humans—by breathing or through the skin. The smallest nanoparticles may even enter the brain.

Government regulation of nanotechnology commenced in October 2008, when the Environmental Protection Agency placed carbon nanotubes under the purview of the Toxic Substances Control Act. All domestic manufacturers of carbon nanotubes now must provide nanotube samples to the EPA, along with the results of an inhalation study in rats.

This and future regulation will assure that risks to human health and the environment will be minimized as nanotechnology advances from the laboratory to production. Insurers will serve a key role by aiding the development of risk management protocols, requiring regulatory compliance to ensure coverage, and partnering with nanotechnology pioneers to spread risk through creative insurance products. BR

Contributor Kevin M. Haas is a member of the Global Insurance Group of the Cozen O'Connor law firm, based in New York City. He can be reached at khaas@cozen.com.