c/o Clean Water Action – 88 Broad Street, Lower Level, Boston, MA 02110

November 18, 2016



Matthew Beaton
Secretary of Energy and Environmental Affairs
Commonwealth of Massachusetts
100 Cambridge St, Suite 900
Boston, MA 02114

Dear Secretary Beaton,

The undersigned organizations and individuals in Massachusetts are committed to preventing harm to our health and our environment from toxic chemicals. We are deeply concerned about the potential hazards posed by the use of nanomaterials in products, which may be released to the environment during production, use or disposal. After careful review we find that there is a near-complete lack of policy and regulatory attention to this matter. We can find little information concerning where these materials are in use or may be released or disposed of. This lack of information means that we cannot even begin to ensure that human health and the environment are being protected. **We are writing to ask that the Toxics Use Reduction Act (TURA) Program conduct a joint effort by the responsible agencies to evaluate options for addressing this problem.**

We believe that TURA Program is the appropriate authority to address this issue because it holds the responsibility of coordinating and overseeing the Commonwealth's efforts to address toxics use and because the Administrative Council's approach is to efficiently consider prevention and streamline efforts. Furthermore, the lack of information and policy concerning nanomaterials affects the agencies charged with public health, occupational health, environmental protection, public safety, and economics that are represented on the Council.

Although these extremely small materials[1] hold vast promise for innovation in virtually every field – energy, the environment, medicine, electronics and transportation to name a few – the intrinsic hazard of many types of nanomaterials cannot be overlooked and warrants greater preventative action to protect community health, worker health and the environment, as well as the business risks of litigation or negative public image.

The physio-chemical properties that make nanomaterials innovative and technologically promising – such as their extremely small size, shape, and high reactivity among other unique

[1] Nanoparticles are defined as having any one dimension 1- 100 nanometers. To put this size in context, a typical virus is ~100 nm. The diameter of human DNA is ~1 nm.

characteristics – are the same properties that cause significant concern regarding their rapid biological uptake, new distribution pathways and interactions with biological systems, and effects in the environment. While more research is needed given the tens of thousands of types of materials that can be manufactured at the nanoscale, evidence of harm has emerged for some types of nanomaterials that warrant specific attention. We highlight two such examples here:

- Carbon nanotubes – both single walled (SWCNTs) and multi-walled (MWCNTs) carbon nanotubes can cause pulmonary inflammation and fibrosis (scarring).[2] In addition, the International Agency for Research on Cancer classified one type of MWCNTs (that are long and rigid – similar to asbestos) as a possible human carcinogen.[3] CNTs are currently used in sporting equipment, armor and small aircraft frames, and anti-static paints, yet current R&D efforts show promising uses of CNTs in a range of high-tech and biomedical applications, including memory devices, biosensors, hydrogen fuel cells and as drug delivery devices. There are dozens of research labs in the Commonwealth using CNTs (as posted on the websites for these labs) and there are several large-scale manufacturers and commercial users of MWCNTs in the metro-Boston area.
- Nanosilver – Nanosilver is an environmentally persistent compound, potent antimicrobial agent and highly toxic to aquatic organisms.[4] Nanosilver is known to be released into sewer systems and surface waters where it can indiscriminately kill fungi, algae and other aquatic organisms and threaten the water treatment processes that depend on microbial activity. In addition, there is concern that the indiscriminate use of nanosilver may contribute to even greater antimicrobial resistance. Nanosilver abounds in current consumer products available on the market today, such as clothing, tableware and kitchen tools, beauty products, bed linens, and baby products among countless others.[5] It is also found in a range of medical devices within the health care sector. It is unknown to what extent industries in Massachusetts are using nanosilver.

In both examples above, there are clear hazards associated with nanomaterials and a clear need for greater regulatory attention that protects workers, communities and the environment. Many other nanomaterials are known to be in use or development, but we do not know where or how or who is using them. We do not know if or where they are being released.

In 2009, the Project on Emerging Nanotechnologies identified Massachusetts as having among the highest concentration of nanotechnology companies, university research programs, and innovation laboratories and organizations in the nation, over 100 self-identified firms and programs.[6] We do not know how many firms are in existence today, because of a lack of reporting requirements. But we do know that Massachusetts has been in a good position to grow this sector of the economy because of the large number of universities located here and the technical know-how of the Massachusetts workforce.

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[2] NIOSH. Current Intelligence Bulletin #65: Occupational Exposure to Carbon Nanotubes and Nanofibers. 2013 See: https://www.cdc.gov/niosh/docs/2013-145/pdfs/2013-145.pdf.

[3] See: http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(14)71109-X/abstract.

[4] A recent hazard assessment reviewing the current body of research literature assigned nanosilver a score of very High concern (with high confidence) [the highest score possible] for acute aquatic toxicity based on GHS Category 1 classification in daphnia, fish and algae. See: Sass J et al. Use of a Modified GreenScreen Tool to Conduct a Screening-Level Comparative Hazard Assessment of Conventional Silver and Two Forms of Nanosilver Environmental Health (article forthcoming).

[5] See: http://www.nanotechproject.org/cpi/browse/nanomaterials/silver-nanoparticle/

[6] Based on research compiled by the Project on Emerging Nanotechnologies housed at the Woodrow Wilson Institute. See: http://www.nanotechproject.org/inventories/map/

Citizens living near a facility using nanomaterials should have the right to know what is being used and released from those facilities, and to expect that their government authorities are aware of such information and have rules and procedures in place to address potential risks. Citizens who buy products containing nanomaterials that could pass through broken skin, or be inhaled or ingested, or which can travel to the brain through the olfactory system, deserve to have notice of these possibilities. Without basic information about where, what, and how much specific nanomaterials are being used and released in the Commonwealth, it is impossible for consumers to take action to avoid these risks, or for authorities to design, implement and enforce effective programs to support the safe development and use of nanotechnology and ensure effective and adequate protections.

We request a comprehensive review by the TURA's responsible agencies regarding regulatory options to enhance efforts to ensure the safe development and use of nanomaterials for workers, communities and the environment. At minimum, please consider advancing the use of existing regulatory authorities and programmatic options to address the following needs:

- assurance to communities that nanofacilities (R&D and manufacturing facilities) are operating safely;
- assurances that nanomaterials are not harming biological life in receiving waters by requiring water effluent testing wherever a facility is using nanomaterials and discharging wastewaters, (in any quantity);
- assurances that agencies required to respond to emergency incidents and events have adequate knowledge about nanomaterials that are being used by facilities in the Commonwealth;
- enhancing community right to know about facilities that use and release nanomaterials by listing nanomaterials of concern to health and the environment to the TURA list of chemicals with a very low "de minimis" threshold– consistent with de minimis definitions used by nanomaterial registries in Europe.

Nanotechnology is an important industry in Massachusetts and the potential future benefits for society are enormous. Given that Massachusetts is in the forefront of development and commercialization of engineered nanomaterials for a broad range of applications, the Commonwealth also needs to be in the forefront of ensuring that the risks never outweigh the benefits. Our hope is that as this industry continues to grow that it will do so in ways that are healthy to the residents, workers and environment. We believe that the Administrative Council is the appropriate organization to begin the process of devising a plan to achieve that goal.

To discuss this matter further please contact Elizabeth Saunders of Clean Water Action at 617-338-8131 x203 or esaunders@cleanwater.org. We look forward to your response.

Sincerely,

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Alternatives for Community & Environment

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cc: Rich Bizzozero, Executive Director of the Massachusetts Toxics Use Reduction Administrative Council, Office of Technical Assistance and Technology