Written Submission from the Citizens' Coalition on Nanotechnology

To the National Nanotechnology Coordination Office on behalf of the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee of the Committee on Technology, National Science and Technology Council (NSTC)

January 31st, 2007

Cate Alexander Brennan
Communications Director
National Nanotechnology Coordination Office
Arlington, VA 22230

Dear Ms. Brennan:

In April 2005, a group of ordinary citizens in the Madison, Wisconsin area met several times over a three week period and wrote recommendations regarding nanotechnology research development--see their "Report of the Madison Area Citizen Consensus Conference on Nanotechnology," which was also submitted to you on Jan. 31,st 2007.

Some of the Consensus Conference participants, in cooperation with faculty in the UW—Madison Nanoscale Science and Engineering Center created Madison's Nano Cafés,[1] which are public gatherings designed to educate participants and to provide an opportunity for engagement and critical thought about nanotechnology issues. The citizens who have been involved in planning and organizing the Nano Cafes have formed their own group, the Citizens Coalition on Nanotechnology (CCoN).

CCoN members help organize Nano Cafés and make resources on nanotechnology available on our website: http://www.nanocafes.org. We believe that sharing different perspectives is essential to healthy public deliberation and democracy and want to have our say in nanotechnology research directions since these decisions and their outcomes will affect us.

We are grateful to be able to submit our comments and are deeply convinced that more funding is urgently needed for environmental, health, and safety research, which we believe should be prioritized as follows.

Environmental Health & Safety Priorities

●Food Safety

We think safety of food should be the highest priority, particularly products which are on the market right now.

People are ingesting food with engineered nanomaterials in it right now. Engineered nanomaterials are in direct contact with the human body (including blood, organs, and other tissues). Scientists haven't studied whether or not these nanomaterials are safe or what their health effects might be over the long run. There are still many unknowns; we know very little about the materials used in these foods.

Because everyone eats food, food safety affects everyone, particularly children. If food containing nanomaterials turns to be harmful, it could have adverse effects on the perception of nanotechnology, setting off an overreaction that could stop or stall other nanotechnologies that could benefit humans.

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1 The Nano Cafés provide a casual atmosphere where non-scientists can hear from experts, ask questions, and share thoughts and concerns. UW-Madison experts explain their work, answer questions and hear ideas from members of the public. For details, see the dedicated website: www.nanocafes.org

We request that more research be done on :

- the nanomaterials that are already in food products on the market
- the potential of nanomaterials used in foods to cross the blood-brain barriers
- what kind of health effects nanomaterials in food products have on the digestive system

In the meantime, while this research is being done, we request that food products that include nanomaterials (either natural or engineered) be labeled.

Finally, nano food products that are currently in development should not be put on the market until more health and safety research has been done.

●Safety of Non-Food Consumer products that are already on the market – with a priority on those which involve ingestion or direct contact with the body (e.g. cosmetics, nanoceuticals, textile)

Many non-food consumer products containing nanomaterials are also currently on the market. Some of these are being inhaled, ingested or applied on the skin. Again, very little is known about the health effects of these nanoproducts.

Therefore, we think there should be a research priority on products that involve ingestion or direct contact with the body (e.g. cosmetics, nanoceuticals, textile). More specifically, we think the following questions should be addressed as soon as possible:

- Do nanomaterials in products put on the skin get through skin?
- What long term effects might these materials have?
- What kinds of health effects do products that are ingested (nutriceuticals) have on the digestive system?

In the meantime, while this research is being done, we request that consumer products that include nanomaterials (either natural or engineered) be labeled.

Finally consumer products containing nanomaterials that are in development right now should not be put on the market until more health and safety research has been done.

●Environmental Releases

Nanomaterials in products that are on the market right now have already entered the environment and, if not, will in the future. Some nanomaterials are being used intentionally for environmental remediation. If they are in the air, the soil, and the water, they are likely to enter human bodies, affect wildlife, and they may also have irreversible eco-system effects.

Given this, we think that the following research questions should be high priorities :

- What environmental releases are occurring from nanoproducts already on market (e.g. nanosilver washing machines, textiles, cosmetics, nanoceuticals, sprays, aereosols)?
- What are their potential health and environmental effects?
- Are they biodegradable ?
- Will they build up in food chain over time?

In order to do answer these questions, researchers need to develop safe sensors for environmental monitoring (air, water, soil) of nanomaterials as soon as possible. Developing these sensors should be a research priority. Releases and levels of nanomaterials in the environment should be tracked and monitored using existing methods and using improved ones once sensors are developed.

In the meantime, we request that methods be developed to prevent the releases of nanomaterials into the environment until more is known about their short and long-term health and environmental effects.

●**Occupational Safety**

We think research on occupational safety should be a priority because people working with nanomaterials are exposed right now on a regular basis. We have no data on human exposures in labs and industries that produce and handle nanomaterials.

Exposure data is very important, since it would enable risk assessors to track exposures and potential health effects through time. It would also help in the development of health and safety protocols as nanomaterial production increases.

We think that the following research areas should be high priorities:

- Developing appropriate and inexpensive monitors for workplace monitoring of nanomaterials.
- More research and monitoring of human exposures and health effects of workers, particularly:
    - in industries that currently produce nanomaterials (particularly nanopowders and nanofibers)
    - in industries that have been making nanomaterials since the 1990's (e.g. fullerenes and nanotubes production facilities)
- Moreover, while this data is being gathered, health and safety protocols should be immediately developed in research labs and industries that handle nanomaterials.

Consumer Protection Bodies

People trust a democratic government to take care of citizens' safety. If our government does not do that, who will?

As US citizens, we are concerned that negligence of government for assuring public safety regarding nanotechnologies could permit disastrous results for us all, short term as well as long term.

All products containing nanomaterials should be tested for human and environmental safety by some appropriate agency (existing or newly created) before they are released onto market or into the environment. This means that there should be adequate funding appropriated to accomplish that purpose.

Communication / Citizen Participation research priorities

People need to know more about these technologies in order to be able to make informed choices about them and to affect research policy in wise ways. That's why we think communication and citizen participation should be high priorities for more funding.

●**Information availability/ Communication**

Currently, the general public largely lacks awareness and understanding of nanotechnologies. However, people have a right to be informed about new developments in science and technologies that affect them. In particular, people have a right to know what is in products they use and consume, and what their health and environmental effects might be, even before certainty about their potential risks is established. They should be given the opportunity to learn about and evaluate information on nanotechnology and make judgments accordingly, even if – all the more when –there are risk uncertainties that experts can't resolve right now.

More upstream communication about health and safety should be a priority, so that citizens' perspectives heard at a stage when they can still influence research priorities.

We request that information free of jargon and of acronyms be shared with the public and policymakers, in a way that is accessible to and understandable by non scientists. In particular, we think that these outreach efforts must be geared towards:

-the people who are directly affected by and in contact with nanomaterials: consumers and people already working with nanomaterials in labs and in industries

In order to communicate with affected individuals, we need to know who and where these affected individuals are. Thus, we need to fund research to track where nanomaterials are being produced, how many workers are in contact with nanomaterials, and who is using these products.

More generally, the public needs more information on nanotechnology research and product development, and especially products that are on the market right now. So, in particular, we think the public should receive more information about the following issues:

–Where nanomaterials are being produced?
–How many workers are in contact with nanomaterials?
–Who is using these products?
–Which products contain nanomaterials, of which elements, at what dose, and what are the risks and the uncertainties associated with them?
–What is the purpose for research grants applied in publicly-funded research institutions?
–What are the potential risks of any products likely to result from nanotechnology research / applications?

In addition, we think that people responsible for making decisions and taking actions to address potential environmental and public health risks related to nanotechnologies should also receive information about the issues listed above and in the rest of this document. In particular, the following public officials should receive this information:

–legislators (at the state and the federal levels) who are and will continue making decisions about public health, environment, science policy;
–staff in federal *and* state/local government agencies responsible for protecting the environment and public health.

We also request that information be made available not only on governmental websites, but also in mass-media and conferences, newspapers, television, radio, magazines, websites, blogs, science museums, and any popular media.

We request the extension of “whistle-blower” protection status for scientists and other experts who raise issues regarding nano materials hazards or potential hazards.

●Public Engagement

People have a right to be involved in what their world and the world of their children will become. Science and technology have--and will continue to have--huge impacts on these worlds, but the public is rarely asked to participate in their making.

Government officials and researchers could learn a lot by talking with citizens, because they have pertinent knowledge and perspectives different from scientists, industries and government experts' perspectives. Citizen perspectives are based on their concerns for peace, human health, and environmental well-being, now and in the future. They are not representative of any interest groups and do not seek short-term profits, but the collective interest. This makes their additional perspectives very pertinent as priorities are set, leading to decisions that are more in tune with public values and interests. Further, the more diverse perspectives that are included (of citizens, scientists, government officials, and industries), the better decisions we can make.

By engaging with citizens, government bodies and researchers can find out if environmental, health, and safety research is relevant to people who are using, working with, and eating products with nanomaterials.

Moreover, by engaging and communicating with people, researchers and risk-communicators can find out if

the people who are most likely to be exposed to nanomaterials have access to information about potential risks related to these materials, whether or not they are getting the information, and what kind of risk information would be most useful and accessible for them.

Government should initiate and fund opportunities for citizen involvement that would include participation with experts in the nanotechnology fields. Scientists and other experts should be required to communicate with the public regarding their work on nanotechnologies through public forums such as town meetings, consensus conferences, workshops, Nano Cafés, and so forth.

Government should commit to and take into account the input and conclusions of citizen recommendations and reports that are developed in citizen engagement efforts. Government should incorporate more regular opportunities for ongoing citizen input into decision-making processes related to nanotechnology development as well as development of other technologies. More regulatory meetings should be open to the public and held in locations that are accessible to diverse participants.

Research Funding Priorities

We have outlined above the specific research and communication/engagement areas we think should be priorities, but we want to emphasize, in conclusion, that given the limited funding allotted for nanotechnology health and safety research, the following areas should be priorities for research funding:

-While the potential for improving life on earth with nanotechnologies is high, the risks associated with some of the uses and applications should be assessed before allowing these materials to be marketed.

-Risk assessment on products already available to the public should be the highest priority for research funding.

-Risk assessment for individuals who are researching and working where nanomaterials are manufactured or used in industry should also be a very high priority. Funding should also help determine the precautions necessary to prevent potential harm to these individuals.

Finally, of the money that is spent on nanotechnology development, we request that there be a focus on developing technologies that improve human well-being and decrease the desire for war. Rather than spending excessively on the means to make war, develop means closer to society concerns so that people's desires can be accomplished cooperatively.

Thank you very much for providing the opportunity to comment on this important issue. We hope you will consider our comments seriously.

Sincerely,

The Citizens' Coalition on Nanotechnology
Madison, Wisconsin