



BROOKHAVEN NATIONAL LABORATORY - NANOSCIENCE SAFETY

Overview for the Nanosafety guidelines that are used at BNL for all Departments/Divisions conducting research on nanomaterials

1. Why the concern for nanomaterial safety? Nanomaterials exhibit unique properties that can affect physical, chemical and biological attributes. Much of the scientific information on the safety, health and environmental hazards of working with these materials is yet to be determined, thus poses an “unknown” risk.

2. What is DOE’s position on nanomaterial safety? Due to the unknown risks, DOE has made nanosafety a priority and issued a *Secretarial Policy Statement on Nanoscale Safety* <http://www.bnl.gov/cfn/docs/09-p4561.pdf>. This Policy requires us to identify and manage potential health and safety hazards and potential environmental impacts through the use of our existing ISM system and keep up to date and implement any consensus standards and/or best practices available.

3. How are nanomaterial risks controlled at BNL? Primarily through the implementation of work planning processes such as Experimental Safety Reviews or Work Permits. In addition, BNL in collaboration with other DOE Nanoscale Science Research Centers, have developed a set of guidelines for the safe handling and disposal of nanomaterial. These guidelines are described in the SBMS interim procedure “Approach to Nanomaterial Safety” <http://www.bnl.gov/cfn/docs/3836d011.pdf>. These guidelines should be integrated into any work plans/ESRs involving nanomaterials.

4. Is the Interim Procedure Necessary or is it Overkill? The basis for the Interim Procedure is a “precautionary approach” similar to how we would address hazards and controls of any unknown substance; not just nanomaterials. In short we treat all nanomaterials as hazardous until proven otherwise. This assures that there are no inadvertent personnel exposures or environmental releases.

5. Do all Nanomaterials have the same level of concern? No. We are concerned with engineered nanomaterials not those that occur naturally. We also apply the following graded approach to rate the potential for worker exposure (in order of increasing risk):

- Solid materials with imbedded nanostructures (lowest risk)
- Solid nanomaterials with nanostructures fixed to the materials surface
- Nanoparticles suspended in liquid
- Dry, dispersible (engineered) nanomaterials, nanoparticle agglomerates or aggregates. (highest risk)

Experiments involving dispersible, engineered nanoparticles require more attention and more stringent controls due to the increased potential for exposure.

6. What are the most important aspects of the interim procedure?

- All work with engineered, dispersible nanoparticulates must be done in an enclosure (hood, glove box etc) with HEPA filtration;

- Good chemical hygiene and housekeeping is essential, use wet cleaning methods and HEPA vacuums to clean up labs;
- Transfer material samples in a closed, labeled container;
- Post areas where dispersible are handled;
- PPE should be based on a specific hazard evaluation and may include nitrile gloves, safety glasses/goggles, long pants and sleeved shirts;
- If you work with dispersible nanoparticles you are considered a “nanoparticle worker”, need to be identified as such and may be required to take a baseline medical exam;
- In some cases, transportation of nanomaterials is regulated by DOT. If not, the nanomaterials still need to be packaged robustly and identified;
- No nanomaterial or material contaminated with nanomaterials, can be disposed in regular trash or down the drain, but instead collected and sent to waste management for processing. This includes items containing, or that have come into contact with, nanomaterials such as gloves, wipes, solutions etc;
- If a spill occurs, secure area and use wet wiping methods and designated HEPA vacs for small spills or call x-2222 for large spills.

7. What are your responsibilities when you do work with nanomaterials?

- Understand and follow the controls established in the ESR, work plan or procedure controlling your work.
- Understand and comply with the SBMS interim procedure “Approach to Nanomaterial ESH” as it relates to your work.
- Understand the consequences (exposures to personnel, impact to the environment, fines, shutdown, etc.) of not following procedures.
- Obtain and maintain required training.
- Respond to emergency situations in an appropriate manner to prevent impacts. Call 2222/911 if you witness something that may be detrimental (nanomaterial spill). Take mitigating actions if you are competent to do so.

8. Who should we call for more information? Contact your ESH Coordinator first, then contact **John Peters** 7475 laboratory SME for nanomaterials or **Steve Hoey** ESH Coordinator for the CFN.

9. What other Resources are available?

- **Nanoscience 101 Series (as previously printed in the Brookhaven Bulletin)**
- <http://intranet.bnl.gov/today/nanoscience.asp>
- **BNL’s implementation plan for the DOE Policy**
http://www.bnl.gov/cfn/docs/Secretarial_Policy_Statement.pdf
- <http://nano.gov/>