

Subject:	Photon Sciences Nano-Science Safety Requirements (Course Code PS-EXP-NANO-SFTY)					
Number:	PS-TRN-CRM-0011	Revision:	B	Effective:	04/30/2012	Page 1 of 3

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*Approval signatures on file with master copy.

[Revision Log](#)

Instructions: Read the material below and then close this document. You will receive credit for training through the BNL training system.

Applicability: This course applies to all experimenters who perform experiments at the NSLS involving the use of nanomaterials. Training is required every two years.

NSLS has requirements for working with **any** nanomaterials. The requirements and controls are increasingly protective based on the risk of exposure to free particulates and can be found in: LS-PRM-1.3.5a, Attachment 5, "NSLS Nano-Science Safety Requirements," located at: <http://www.bnl.gov/ps/nsls/newsroom/publications/manuals/prm/PS-ESH-PRM-135a.pdf>

Course Objective: This course is designed to provide experimenters with interim information to protect human health, the environment, and to meet Laboratory and Government regulations for handling nanomaterials.

UNP Definition:

- a. Engineered nanoparticle means intentionally created (in contrast with natural or incidentally formed) particle with one or more dimensions greater than 1 nanometer and less than 100 nanometers.
- b. Unbound Engineered Nanoscale particles (UNP), those nanoscale particles that are not contained within a matrix under normal temperature and pressure conditions that would reasonably be expected to prevent the particles from being separately mobile and a potential source of exposure. An engineered primary nanoscale particle dispersed and fixed within a polymer matrix, incapable as a practical matter of becoming airborne, would be "bound," while such a particle suspended as an aerosol would be "unbound."

Awareness Training for Users of UNP:

- Nano-scale materials have unique properties that may differ from the same material in the bulk state. There may be differences in reactivity and the toxic potential of nanoscale and macro forms of the same materials. The health hazards and environmental effects of nanoscale materials are not well defined.
- Personnel exposure can result from inhalation, accidental ingestion, or through intact skin. Nanomaterials may have unusual exposure routes and transport within the body. The effects of the exposure may occur remotely from the site of exposure due to transport within the body.
- Given the incomplete health effect information available, all nano-scale materials must be respected as potentially toxic. Exposure and environmental releases must be kept as low as reasonably achievable. Measurement techniques for evaluation of occupational exposure are limited for nano-sized particles, and exposure standards do not exist.
- For further information on the materials, the Material Safety Data Sheets (MSDS) can be accessed from the Chemical Management System, however, most MSDSs are available for bulk materials only, and may not be useful in evaluating the hazard potential of nano-sized materials.

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- Work with nano-scale powders (UNP) presents the greatest risk of dispersion and of personnel exposure or environmental release. Powders must be contained at the beam lines and may only be manipulated within the HEPA filtered hood or glove box (see below).
- BNL employees that work with Unbound Engineered Nanomaterials are required to undergo a baseline medical exam. Guests or users may request guidance from the BNL Occupational Medicine Clinic and inquire about physical exams at their home institution.

If UNP manipulation is required, it must be done in the HEPA filtered hood or glove box in Lab 1-128 and the following additional training may be required.

- To use the NanoHood in Room 1-128, you must also complete this training:
NSLS SOP LS-ESH-0051 NanoHood Ops, Rm 1-128 (LS-PROC-NANOHOOD-128)
- To use the Glove Box in Room 1-128, you must also complete this training:
NSLS SOP LS-ESH-0053 Nano Glove Box Ops, Rm 1-128 (LS-PROC-NANOBOX-128)

These courses are available through the BNL training website at:

<http://training.bnl.gov/demo/courses/PhoSciWebCourses.htm>

