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Revision Log

Experimental work with biological materials is ongoing at several NSLS beam lines. Scientists study proteins and nucleic acids with techniques that involve use of cryogens and various laboratory solutions in milliliter quantities. Sample crystals are manipulated and analyzed by individual researchers using procedures that employ standard laboratory precautions for control of the risks presented by this work. This group of biology experiments presents little concern to personnel or the environment as the materials required are easily controlled and the samples under study are harmless.

On occasion, a biology proposal involves work with toxic or infectious samples and these require special planning. Work with bacterial toxins or infectious crystals requires careful evaluation of potential hazards and required controls. Guidelines for precautions needed to work with these biohazardous materials are published by the Centers for Disease Control (CDC). Review of the CDC guidelines with attention to the unique conditions presented by work at our facility has resulted in our decision to restrict biohazardous materials work to materials and procedures that require CDC Biosafety Level 2 (BSL-2) precautions or less. A technical basis for that decision has been defined and includes requirements for both engineering and administrative controls to be included in the planning of all BSL-2 work at the NSLS. There are no plans for advancing to BSL-3 precautions.

Review of experiments for the recognition, evaluation, and control of hazards is also ongoing and recent reviews have helped clarify and refine our requirements for experiments that present biosafety concerns. Researchers working with biohazardous samples must understand the risks presented by their experiment and provide a written plan for control of those risks. The lead experimenter is responsible to ensure that personnel working on the experiment receive appropriate training regarding their duties and the necessary precautions to prevent exposures. Each experiment that involves biohazardous samples must receive individual review and approval before work at the Light Source begins. An outline of expected requirements for BSL2 work follows.

- Researchers are expected to know and follow standard microbiology laboratory precautions.

- A careful inventory is required to assure that all samples are either destroyed or returned to the User's home institution at the end of each experiment.

- Only one crystal may be manipulated at any time. Other crystals are to remain in storage.

- All work must be restricted to the X-ray hutch or to a small defined area in close proximity to the hutch.

- Work areas shall be posted with the appropriate biohazard warning signs (including biosafety level, lead experimenter's name and phone number, and required procedures for entering and exiting the area).

- The BSL-2 samples must be under the constant supervision of a Researcher for the duration of the experiment. Arrangements for securing samples in locked containers may be made should all members of the research group need to leave the beam line.

- Researchers working with BSL-2 samples must have academic credentials beyond the bachelor's degree level and must have at least 1 year of experience working with BSL-2 materials.

- Samples must be transported in sealed containers with secondary containment in accordance with US Department of Transportation (DOT) rules.

- A disinfectant, such as ethanol, isopropanol, or hypochlorite solution, must be available and all surfaces in the vicinity of the samples must be routinely disinfected during the experiment, at the completion of the experiment, and when a spill or splash of any potentially infectious agent occurs.

- Surfaces directly under the sample manipulation and storage areas must be covered with adsorbent pads to capture spills.

- Researchers must wear the appropriate gloves, lab coats, and eye protection while manipulating samples. Disposable latex or nitrile gloves are acceptable in most cases. Gloves must be removed and replaced often and whenever immersed or splashed with solvents used for disinfection or contaminated with BSL-2 material. All protective clothing must be removed before leaving for non-BSL areas. All gloves, regardless if they are contaminated or not, must be disposed as regulated medical waste. Disposable lab coats are recommended for BSL-2 work and may be reused if not contaminated. Once the lab coat is contaminated, it must be disposed as regulated medical waste. Eyewear must be disposed of with other contaminated waste or decontaminated before reuse.

- At least two Researchers must be present at all times when BSL2 materials are in use. Each must be familiar with the procedures and risks, maintain visual contact with the other, and be prepared to assist in the event of an accident.

- The NSLS Control Room must be notified of any spills or loss of control of any sample.

- Procedures that may produce an aerosol of BSL-2 material are prohibited. Mounting of warm crystals at the NSLS is prohibited. Only frozen crystals may be brought to the NSLS and placed in the synchrotron beam. Work with warm crystals presents an unacceptable risk of either losing a crystal or creating an aerosol.

- No extended storage of BSL-2 materials is allowed at the NSLS. At the completion of an experimental run, all BSL-2 materials must either be disposed or returned to the Researcher's home institution.

- Any equipment and adsorbent pads that may have contact with BSL2 materials must be disposed as biohazardous wastes. Specific arrangements must be made with the BNL Medical Department and BNL Waste Management Division for this disposal.

- Needles and other sharp instruments must be disposed in biohazard sharp containers and all other contaminated materials shall be disposed of in IC containers or red biohazard bags. The above-mentioned containers and bags shall be managed as regulated medical waste and disposed of through the BNL Medical department and the BNL waste Management Division. Additional training is required before the generation of waste is permissible.

- Personal health status may impact an individual's susceptibility to infection, ability to receive immunizations or prophylactic interventions. Therefore, all Personnel working on the experiment who are susceptible to infection or women of childbearing age should be provided with information regarding immune competence and conditions that may predispose them to infection. These individuals should be indentified during the experiment review process so that they can receive the appropriate counseling and guidance from the Lead Researcher and the NSLS Safety Staff.