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## Photon Sciences Directorate Policies and Requirements Manual

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### 1.0 PURPOSE

This document is provided to expand on the requirements found in the BNL SBMS Subject Area titled “LEAD” found here:

[BNL SBMS Lead Subject Area](#)

The requirements outlined here are intended to control the personnel and environmental risks associated with lead work projects. All lead work must be planned with attention to dust minimization, good housekeeping, personal hygiene, collection of scrap, and hazardous waste disposal.

### 2.0 SCOPE

This document applies to:

- Work with lead containing solder associated with electronic equipment assembly or repair.
- Installation and removal of lead shielding on the accelerator and beamlines that can be completed in 30 minutes or less.
- Machining of lead
- Cleanup of lead surface contamination

All lead shielding work is evaluated for exposure risk. A general assessment is documented in PS-JRA-0025. Individual lead jobs are evaluated through review with ESH staff.

Projects requiring more than 30 minutes of lead shielding handling require Enhanced Work Planning.

### 3.0 GENERAL CONTROLS

Lead surfaces located where personnel could have frequent contact with the material should be painted or covered. This includes bricks and lead sheet inside the hutches and near workstations where personnel are likely to have contact with the shielding.

Lead bricks that are removed for access to synchrotron or beam line components should be replaced with painted bricks if feasible.

Spray painting is not allowed on the experimental floor or in any of the exhaust hoods.

## ENHANCED WORK PLANNING

Projects that exceed the scope of this guidance are to be referred to the PS Work Planning process for evaluation. The following are to be considered.

- Personnel Protective Equipment (including the need for respiratory protection)
- Personal air monitoring
- Contamination control
- Waste minimization, packaging and disposal

Decision on what controls are required are based on past monitoring for airborne lead concentrations, general area ventilation, the duration of the project, and the work area construction.

### 3.1 SOLDERING STATIONS

The soldering stations that are used for electronic assembly and rework throughout PS directorate should be established and properly maintained using the following criteria:

- Demarcate the soldering station boundaries using yellow and black caution tape.
- Safety glasses, long pants, and fully enclosed shoes are required when soldering
- Keep food and drinks out of the demarcated area.
- Area should be setup with an ESD mat or other heat resistant /chemical resistant material.
- Minimize storage of equipment not related to soldering within the marked boundaries.
- Post the area with a caution sign “Lead Soldering Station, Poison No Smoking Eating or Drinking in this Area” found here: [\*Solder Station Warning Sign\*](#)
- A solder recycling container is required for each station and should be labeled as “Solder Scrap for Recycling”
- Purchase lead wipes for your area and clean the surfaces after each use, or if the station is being used on a continual basis, once every week. Dispose of these in the trash (see TCLP analysis attached below). Contact the Photon Sciences Environmental Compliance Rep for questions.
- Wash hands after any work within the soldering station boundaries.

The use of soldering irons for repairs at remote equipment locations should meet the following requirements:

- Keep food and drinks away from the repair area.
- A solder recycling container should be available at the repair location and should be labeled as “Solder Scrap for Recycling”
- Hands must be washed after work using the soldering iron.

### 3.2 SHIELDING MOVEMENT - LEAD BRICK OR SHEETING

- A **Lead Work Area** must be defined to minimize the area where lead contamination may occur during Lead handling. A table or desktop could be designated as the **Lead Work Area**. That surface must be completely cleared and covered with disposable paper or plastic material to avoid surface lead contamination and facilitate cleanup. Isolate lead work to as small an area as possible to minimize spread and tracking of lead dust and filings.
- Personal Protective Equipment (PPE) required for lead material handling consists of: safety glasses with side shields, long pants, lab coat and/or tyvek coveralls, cloth or leather work gloves, and safety shoes. When heavy gloves are inconvenient and interfere with efficient work progress, the second choice is to use disposable nitrile gloves
- The HEPA vacuum maintained by the NSLS User Shop Machinist should be used when practical to remove loose dust from surfaces before and during disturbance of the shielding.
- **Lead Working Areas** potentially contaminated with lead dust or filings must **not** be cleaned by dry sweeping. These areas must be cleaned either by wet wipe, or use a HEPA vacuum (followed by wet wipe).
- All surrounding surfaces should be cleaned by wet wiping, with cloths specifically meant for lead cleanup.
- Dispose of wipes in the trash, unless otherwise determined by work planning.

- After gloves are removed, hands must be washed. Gloves used for handling lead must be segregated, and bagged and labeled when not in use. Do not use lead handling gloves for other work.

### 3.3 LEAD MACHINING OR CUTTING

- A **Lead Work Area** must be defined to minimize the area where Lead contamination may occur during lead handling. A table or desktop could be designated as the **Lead Work Area**. That surface must be completely cleared and covered with disposable paper or plastic material to avoid surface lead contamination and facilitate cleanup.
- Personal Protective Equipment (PPE) required for lead material handling consists of: safety glasses with side shields, long pants, lab coat and/or tyvek coveralls, cloth or leather work gloves, and safety shoes. When heavy gloves are inconvenient and interfere with efficient work progress, the second choice is to use disposable nitrile gloves
- The HEPA vacuum maintained by the NSLS User Shop Machinist should be used when practical to remove loose dust from surfaces before and during machining.
- Lead sheet may be cut with hand shears at any established **Lead Work Area**.
- **ALL LEAD BRICK CUTTING MUST BE DONE ON DESIGNATED MACHINES IN DESIGNATED AREAS. Check with the Machine Shop Steward.**
- The band saw must be cleared of debris before cutting any lead to isolate the lead scrap and shavings from other metals.
- A coarse toothed blade operating at low speed is best for minimizing airborne lead during cutting. Lead cutting within the scope of this procedure does not require local exhaust ventilation or respiratory protection.
- All lead scrap and debris must be collected in a sealed plastic container for recycling, or disposal as a RCRA Hazardous Waste (See Wastes Section of this procedure).
- When a shielding cutting project is complete, the floor within the **Lead Work Area** and under the band saw, if the saw was used for cutting, must be cleared of lead scrap and then vacuumed with a Lead HEPA filtered vacuum, and then wet wiped, using wipes designated for lead cleanup. These surfaces are to be left free of any visible lead accumulations.
- Surface wipe sampling may be needed to verify cleaning.

### 3.4 SURFACE CONTAMINATION CLEAN UP

Large surface area cleanups should be evaluated by ESH staff to determine PPE and waste disposal, using a graded approach determined by the level of contamination and size of the area to be cleaned.

- Safety glasses with side shields and disposable gloves are the minimum PPE.
- The area to be cleaned may be vacuumed with the Lead HEPA filtered vacuum.
- Wet wipes designed for Lead Abatement should be used.
- Wipes can be disposed as trash, unless otherwise determined by the Environmental Compliance Rep.

**4.0 WASTES** Lead scrap is recycled. There are two collection places for lead scrap collection in Bldg. 725, near the stock room:

- Scrap that can be reused for shielding is placed on a pallet that is covered with a plastic sheet.
- Scrap that is too small to be reused and chips and filings from lead cutting are placed in the wooden crate adjacent to the pallet. The crate is also covered with plastic sheet. This scrap is recycled through the BNL Central Shops Division.
- Lead solder balls and splatter, generated at every soldering station, must be collected in a container labeled as, "Solder Scrap for Recycling." This material is recycled through the BNL Central Fabrication Services Division.
- Lead shielding removed from NSLS Activation areas that has been in contact with the electron beam chamber must be radiation surveyed and segregated from other lead material. Contact Facility Support for assistance.

## 5.0 TRAINING

- All personnel working with lead must complete the web based Lead in the Workplace (TQ-LEAD1) training.
- All personnel involved in lead machining or cutting must complete the web-based NLSL Environmental Awareness for Lead (LS-ENV-LEAD) training before beginning lead machining or cutting operations.

### Attachments

#### TCLP Analysis for lead cleaning wipes



Adobe Acrobat  
Document