

Procedure for Removing Shielding Material in the Ratchet Wall Penetrations for the ID and BM Beamlines

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Table of Contents

1.0	Introduction
	1.1 Purpose
	1.2 Scope
	1.3 Applicability
	1.4 Type of Procedure
	1.5 Hazard Controls
2.0	Background
3.0	Procedure
4.0	Documentation
5.0	Training

1.0 Introduction

1.1 Purpose

The purpose of this document is to describe a step-by-step method for removing shielding (lead shot and lead bricks) in the ratchet wall penetrations for both bending magnet and insertion device beamlines.

1.2 Scope

This procedure covers the following:

- Step-by-step method to be followed whenever shielding is to be removed from a ratchet wall to allow removal of the beamline collimator.

- Recommissioning required following the shield removal or modification.

1.3 Applicability

This procedure applies to all personnel who perform work on removal of shielding (lead shot and lead bricks), from all ratchet-wall penetrations for ID and BM front ends.

1.4 References

APS Configuration Control Policy for supplemental personnel protection radiation shielding, 11110-00028

ANL-E ES&H Manual, Chapter 7, Section 7.1: Control of Hazardous Energy and Lockout/Tagout

1.5 Type of Procedure

This procedure is a step-by-step procedure.

1.6 Hazard Controls

This document does not address validation of shielding; it only addresses the removal of shielding and any associated components already in place. Therefore, specific hazards must be addressed by the procedures which apply to the specific work that is to take place.

Persons performing this work shall be familiar with the hazards of lead and the steps they can take to minimize exposures. This information can be obtained from: Lead: Hazards and Controls Training (ESH171).

Because removal of lead shot and lead bricks may release lead oxide, an approved HEPA vacuum should be available. Personal and general area samples may be collected by EQO-IH, in order to determine airborne lead concentrations while personnel are removing the shielding from the wall. EQO-IH must be notified before work begins to determine if this is necessary.

All other safety procedures that apply for this job shall also be addressed, such as the ASD Lockout/Tagout procedure.

2.0 Background

The ME group is frequently requested to remove shielding material in the ratchet wall penetrations, due to ongoing upgrades of ID and BM beamlines.

This procedure is to be followed by the ME technicians for the sole purpose of controlling a hazardous waste. The steps used here will control exposures to lead and lead oxide.

3.0 Procedure

3.1 Verify through the Work Request and the Responsible Engineer which shield is to be modified and its location

1. Notify EQO-IH of work so they can determine whether air monitoring is necessary.
2. Acquire work permit to change Wall shielding configuration (CCWP).
3. All Ratchet wall Collimator shields have their own number# (The Responsible Engineer should make sure that the exact shield number and location is stated in the Work Request submitted for the job).
4. When this is done, ASD Lockout/Tagout procedures are followed.
5. Give the signage (shield number) removed from original shield to the appropriate HP (Health Physics) authorities so removal of this shield is recorded.
6. The Floor Coordinator (FC) must be notified of the work, there-by posting the CCWP in the appropriate beamline cabinet.

3.2 Containment

1. After the ASD/VAC group has disconnected and blanked off the subject vacuum components, apply plastic sheeting with either duct tape or cloth tape to the wall beneath the shielding to be removed. The plastic should drape down and across the floor, covering all of the area where the work will be performed. This is to be done on both sides of the ratchet wall.
2. An area outside of the storage ring and the beamline hutches shall be roped off with signage stating "Lead Hazard Area".

3.3 Removal and Installation of Hardware

1. Remove vacuum component supports from the ratchet wall on both sides.
2. Using the existing mounting holes from the supports, attach the prefabricated funnel to the wall below the fill-plug holes.

3.4 Lead Shot Removal

1. Ensure that each employee working on the removal of lead shielding is wearing all the proper PPE.
2. Place five-gallon plastic carboys on a skid or another type of moving device near the area below the funnel, for transporting lead shot out of the tunnel and hutch. The same device shall be used for moving the lead bricks.
3. With a hose attached to the bottom of the funnel and a five-gallon carboy, remove the bottom fill plugs one at a time, in order from left to right, until the flow stops. This work shall all be done in the plastic sheeted containment area.
4. Remove bolts and upper cover assembly.
5. With a brush, sweep remaining lead shot to the fill-plug hole until the major portion of shot is drained to the carboy.
6. Remove upper lead bars then lower jack stand and remove.

7. Remove lower lead bars, and sweep out the remaining shot.
8. Remove the lower plate and using the vacuum with a HEPA filter mentioned in section 1.6, vacuum out the cavity of any remaining lead shot.
9. Repeat steps 1-8 above for the other side of the ratchet wall.
10. Remove and vacuum the poly plates with the HEPA-filtered vacuum.
11. Vacuum the collimator before removing it from the lead containment area.
12. Remove the inside and outside lower cover assembly.
13. Vacuum the entire opening created by the shielding removal.
14. After all of the shielding material is moved from the tunnel and hutch to the roped off area created just outside, vacuum the entire area to pick up any loose lead or lead oxide that is present.
15. Cover the lead with plastic sheeting for containment.
16. Discontinue air monitoring if applied and remove monitors from personnel.
17. Remove the shielding materials and store them within a designated lead holding area according to ESH policies.
18. Inform the FC of the completion of work.

4.0 Documentation

This procedure shall be reviewed and revised as required by the ASD Mechanical Engineering Group as design changes or operating experience warrant.

5.0 Training

1. Resp. Protection-Air-purifying Respirator (ESH 118)
2. ASD Lockout/Tag out Training (ASD125)
3. Lead: Hazards and Controls Training (ESH171)
4. Personal Protective Equipment (ESH 195)
5. Electrical Safety Training-General (ESH 371)
6. Accelerator Worker Training (ESH 707)
7. ESH 738 - GERT (General Employee Radiation Training)

