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Brookhaven National Laboratory

**Document No:** LS-SDL-0022

**Revision:** 1

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**Subject:** SDL PRE-ENGINEERED LIFT PROCEDURE: LEAD SHIELD BLOCKS  
WEIGHING 409 POUNDS

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1. **PURPOSE**

This procedure covers the removal and installation of the U shape lead shield blocks weighing 409 pounds on the SDL beam line.

2. **REFERENCES**

- 2.1. ES&H 1.5.1 Lockout/Tagout Requirements
- 2.2. ES&H 1.6.0 Material Handling: Equipment and Procedures
- 2.3. ES&H 1.6.1 Material Handling: Operator Training and Qualifications
- 2.4. ES&H 1.6.2 Lifting Safety
- 2.5. DOE-STD-1090-2001 Hoisting and Rigging
- 2.6. Drawing No. SDL-505.02-002 Source Development Lab Linac Shielding Lead Casting

3. **PRE-REQUISITIES**

- 3.1. The beam line shall be shut down and LOTO applied prior to starting this lift.
- 3.2. Barricades shall be erected to prevent un-authorized personnel from entering the area.
- 3.3. All personnel shall wear proper Personnel Protective Equipment (Hard Hat, Safety

Shoes, Gloves).

- 3.4. All local hazards shall be located and identified.
- 3.5. A Critical Lift Review Form shall be submitted to and approved by the BNL Lifting Safety Committee.
- 3.6. No work shall be performed on the shield blocks while suspended from the crane.
- 3.7. A minimum of two(2) people, Crane Operator and Signal Person, shall be present to complete this procedure.
- 3.8. All personnel, authorized to be in the area, shall know and be capable of demonstrating the Emergency Stop Signal.

#### **4. ROLES AND RESPONSIBILITIES**

- 4.1. A Person(s) In Charge (PIC) shall be designated by the NSLS. PICs shall be qualified as per ES&H 1.6.1 Material Handling. A PIC shall be present during any lift. The PIC shall not be the Crane Operator.
- 4.2. One person shall be designated as the crane operator. He shall have a current SAC card for Crane Operator (Q010 and Q010A) and have completed the Basic Rigging Course (GST155). Only this person will operate the crane during this lift.
- 4.3. One person shall be designated as the signal person. This person shall have a current SAC card for Crane Operator (Q010 and Q010A). Only this person will give signals to the crane operator.

**NOTE: THE CRANE OPERATOR SHALL OBEY A STOP SIGNAL FROM ANY PERSON.**

#### **5. EQUIPMENT**

Only the following equipment shall be used for each lift. (Rigging equipment use for pre-engineered lifts SHALL be designated for and NOT replaced or changed during the life of the approved pre-engineered lift).

- 5.1. SDL Overhead Crane 729-CRNE001 (2 ton capacity)
- 5.2. 2 each,  $\frac{3}{4}$  Inch Shouldered eyebolts (Vertical WLL: 5,200#)
- 5.3. 2 each, 2 ton screw pin anchor shackles (minimum)

- 5.4. 2 each, 1 inch, one ply 3 foot long synthetic web with hooks (WLL 4,300 lbs @ 45 °)
- 5.5. Hard hats
- 5.6. Safety shoes
- 5.7. Gloves

## 6. **INSPECTIONS**

- 6.1. The crane shall have a current annual inspection by the BNL Hoisting and Rigging Inspector.
- 6.2. All slings shall have a current annual inspection by the BNL Hoisting and Rigging Inspector.
- 6.3. A daily Overhead Crane/Hoist Inspection Checklist shall be completed at the beginning of each shift.
- 6.4. All rigging (eyebolts, shackles, slings etc.) shall be inspected for signs of wear at the beginning of each shift.
- 6.5. All threaded lifting holes shall be inspected for clean and proper threads.

## 7. **PROCEDURE**

**CAUTION: The area over the beam line has many obstructions. Use extreme caution when working in this area.**

- 7.1. The following steps shall be followed for the removal of each shield block from the Beam Line.
  - 7.1.1. Remove all restraints from shielding.
  - 7.1.2. Position the overhead crane hook over the shield block that is to be removed.
  - 7.1.3. Install the slings onto the crane hook making sure that hook mouse seats properly.
  - 7.1.4. Install the eyebolts into the shield block. Use shim washers under the

shoulder in order to ensure that the slings will pull in the same plane as the eye.

**CAUTION: Improper shimming of the eyebolt shoulder can cause excessive shear and failure.**

- 7.1.5. Using shackles connect the slings to the eyebolts in the shield block.
- 7.1.6. Take up the slack in the rigging. Check all of the rigging for proper alignment. Lower the load and adjust if necessary.
- 7.1.7. Lift the shield block high enough to clear the beam line.
- 7.1.8. Move the shield block south and lower onto the floor.
- 7.1.9. Disconnect the rigging from the shield block.
- 7.1.10. Repeat steps 7.1.1 thru 7.1.8 for each shield block to be removed.
- 7.2. The following steps shall be followed for the installation of each shield block onto the beam line.
  - 7.2.1. Position the crane above the shield block to be lifted onto beam line.
  - 7.2.2. Install the slings onto the crane hook making sure the hook mouse seats properly.
  - 7.2.3. Install the eyebolts into the shield block. Use shim washers under the shoulder in order to ensure that the slings will pull in the same plane as the eye.

**CAUTION: Improper shimming of the eyebolt shoulder can cause excessive shear and failure.**

- 7.2.4. Using shackles connect the slings to the eyebolts in the shield block.
- 7.2.5. Take up the slack in the rigging. Check all of the rigging for proper alignment. Lower the load and adjust if necessary.
- 7.2.6. Lift the shield block up and into position on the beam line.
- 7.2.7. Disconnect the rigging from the shield block.

- 7.2.8. Repeat steps 7.2.1 thru 7.2.7 for each shield block to be installed.
- 7.3. Inspect all rigging and return to its storage locker.
- 7.4. Return the crane to its normal storage position.

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