

Brookhaven National Laboratory/ LIGHT SOURCES DIRECTORATE			
<b>Subject:</b>	<b>Securing the LINAC/Booster Area</b>		
<b>Number:</b>	LS-OPS-0003	<b>Revision:</b>	C
		<b>Effective:</b>	7/18/2008
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Prepared/approved By:	M. Buckley	Approved By:	R. Church
		Approved By:	J. Aloï

\*Approval signatures on file with master copy.

[Revision Log](#)

## 1.0 PURPOSE

The purpose of this document is to provide guidance for the Operations Group personnel and other qualified persons performing a LINAC-Booster search for operational purposes and how to Un-Secure/break security from a secured LINAC-Booster.

## 2.0 SCOPE

The inside of the LINAC-Booster Area can contain high levels of radiation during injection. To ensure the utmost in personnel safety at the NSLS, personnel listed in "Qualified Search Personnel for NSLS Accelerators" must complete the search of this area or break security in the area to allow personnel access.

## 3.0 RESPONSIBILITY

Searcher: The searcher must assure that no person remains inside the LINAC-Booster area after the search has been completed. These individuals are also required to assure all LINAC-Booster main magnet power supplies and klystrons have been turned off prior to breaking security in the tunnel.

Control Room Operator: The on duty Operator must always be aware of the status of the interlocks and in control of the status.

## 4.0 PREREQUISITES

4.1 The LINAC-Booster may be secured by one qualified person (refer to "Qualified Search Personnel for NSLS Accelerators", LS-ESH-0009).

4.2 Permission for securing the LINAC-Booster must be given by the Control Room Operator on duty.

4.3 All personnel shall be asked to leave the area before the search begins.

4.4 The searcher should determine that all work in the LINAC-Booster has been completed.

4.5 The rear entrance door to the LINAC-Booster area must be closed and the Kirk Key for this door must then be transferred to the SRU by CS-3.

4.6 Press Reset Button on panel at LA1-SR8 if necessary to reset "Booster Door" or "Emergency Stop" latches.

## 5.0 PROCEDURE

Refer to figure [LB-1](#) for the location of Emergency Stops, Check Stations, Door Guard pushbutton, and the proper Search Path to be followed for this procedure. During the search through the LINAC-Booster area, the searchers must do the following:

- The searcher must look carefully for any persons who may be in the LINAC-Booster area.

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- The searcher must announce verbally that the area is being secured, numerous times throughout the search process.
- 5.1 Enter the LINAC-Booster area through the Front Door entrance and then close the door.
- 5.2 Press the "Door Guard" pushbutton - the indicator will light.
- 5.3 Proceed to **Start Search**, crossing the ring via the two sets of stairs.
- 5.4 Press **Start Search** after verifying that no persons are in the LBD1 cave.
  - Pressing Start Search activates the red beacon lamps, located throughout the LINAC-Booster area, and starts a 3-minute timeout period. The search must be completed within this duration.

The search must be stopped if any persons are encountered and then restarted when all persons have left the area.
- 5.5 Proceed to CS-1 following the search path indicated in figure LB-1. Scan the area above the X-ray tunnel to verify that no one is there.
- 5.6 Press CS-1 after verifying that no persons are in the area behind the injection straight.
- 5.7 Proceed to the "Door Guard" pushbutton following the search path indicated in figure LB-1.
  - Check the Booster door alcove and scan under and behind the LINAC shielding to verify that no one is there.
- 5.8 Press the "Door Guard" pushbutton - the indicator will light.
- 5.9 Exit via the front entrance door and then close the door.
- 5.10 Remove the Kirk Key from the front entrance door.
- 5.11 Insert the front door Kirk Key into the SRU by CS-E and Turn the key fully clockwise.
- 5.12 Press the "Search Complete" check station, CS-E.
  - 5.12.1 An audible alert will sound for approximately 30 seconds after CS-3 is pressed.
  - 5.12.2 The interlock sign above the entrance door will illuminate.
  - 5.12.3 The Booster Secure 'A' and 'B' lamps at LA1-SR8 will come on when the audible alarm completes its cycle.
  - 5.12.4 If the audible alarm does not sound after pressing CS-E, most likely the 3 minute timeout period had expired. If this occurs, the searcher must re-search the LINAC-Booster area.
  - 5.12.5 If the 'B' lamp does not come on after the three minute timeout period, most likely the Kirk Key was not turned prior to pressing CS-E. The LINAC/Booster area will have to be re-searched if this occurs.

## 6.0 LINAC-Booster Emergency Stop Buttons

Pressing any of the emergency stops in the LINAC-Booster area or either of the VUV or X-Ray ring emergency stop buttons in the control room will disable the LINAC-Booster. The fault will need to be reset at LA1-SR8 prior to securing the LINAC-Booster area.

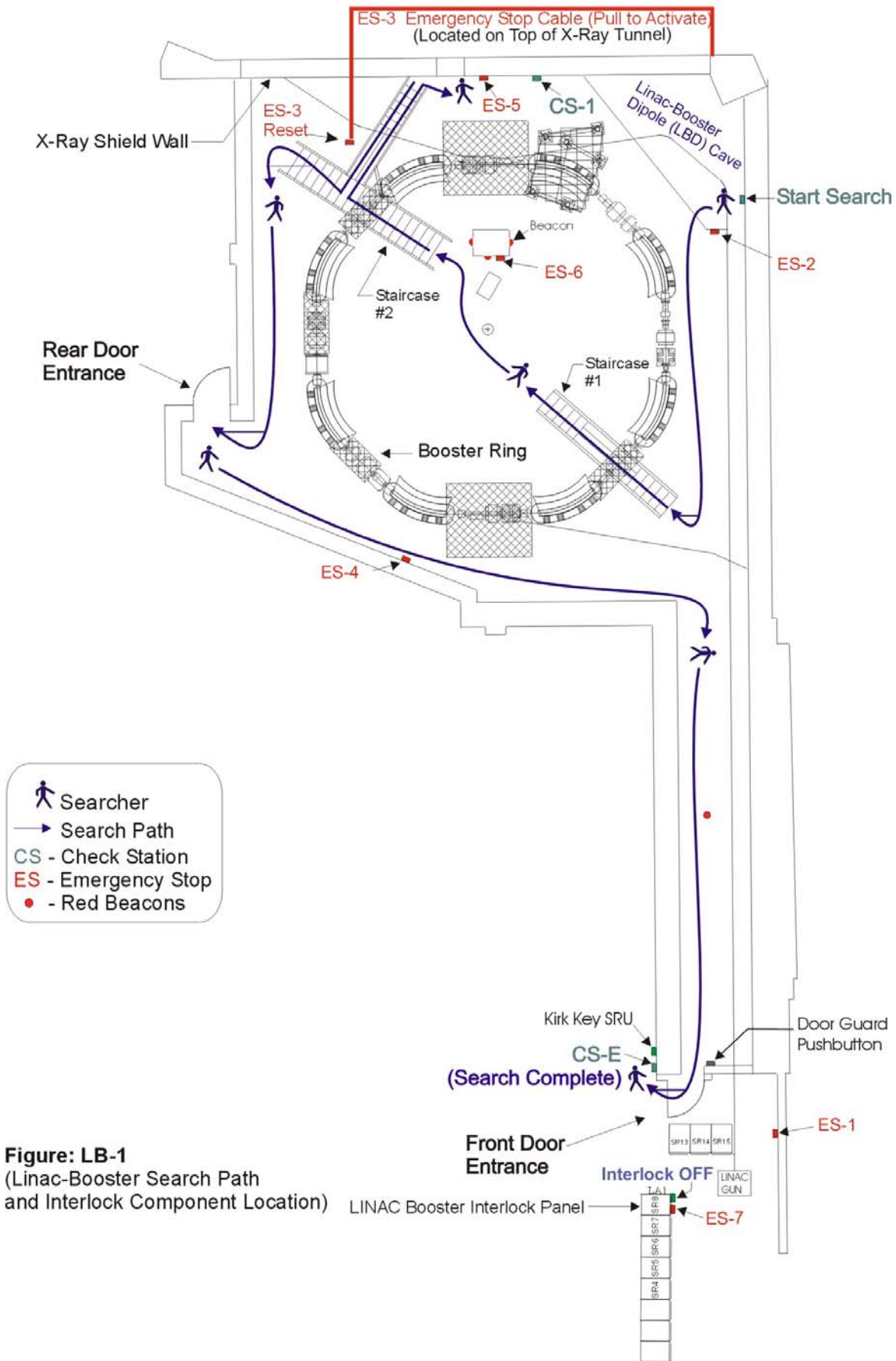
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## **7.0 Un-Secure/Breaking Security in LINAC-Booster Area**

- 7.1 The machine operator must command all LINAC-Booster Main power supplies and klystrons OFF.
- 7.2 An authorized searcher listed on LS-ESH-0009 must verify that all indicators on the "Power Supply Status" panel at SR8 all indicate OFF. If all power supplies indicate off then the searcher presses the "Interlock Off" button at SR8, removes the key from the Solenoid Release Unit (SRU), and places the key in the entrance door.

## **8.0 LINAC-Booster Interlock Fault**

A "LINAC-Booster Interlock Fault" alarm will occur in the Control Room when security is broken for any reason other than using the Interlock Off button. A door opened, an emergency stop button pressed, or the Kirk Key removed from the SRU with the LINAC-Booster interlocked are some of the causes for this interlock fault.



**Figure: LB-1**  
(Linac-Booster Search Path and Interlock Component Location)

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<b>Document Review Frequency</b>
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<b>3</b> Years
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Review signatures on file  
with master copy of  
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### LIGHT SOURCES DIRECTORATE REVISION LOG

<b>Document Number:</b>	LS-OPS-0002	
<b>Subject:</b>	Securing the VUV Ring	
Rev	Description	Date
0	Initial Document	12/15/1997
B	Changed reference for Qualified Searchers to new document LS-ESH-0009 and removed section 6 for qualified searchers.	2/1/2002
C	<ul style="list-style-type: none"> <li>• Revised the numbering of the Check Stations to be consistent with the changed numbering on the check stations.</li> <li>• Added instructions on how to Un-secure the VUV Ring in various sections including section 7.0.</li> <li>• Figure 1-UV changed to illustrate location of power supply Read Back panel and interlock off button.</li> <li>• Changed review frequency from 2 to 3-years.</li> </ul>	7/18/2008