

# Search and Secure

**This discussion is the first part of your search and secure training.**

The other four parts include:

- General Search and Secure Procedure "BDDP-OP-0200," (Read and Sign)
- Search and secure Maps (OJT)
- Enclosure Specifics (OJT)
- LOTO Training, (Read and Sign)

## **What is the Purpose of the Search and Secure?**

- **The Primary Objective of searching an enclosure is to clear the area of all personnel.** Radiation and electrical hazards threaten anyone who remains in an enclosure that has received a beam permit. Operators involved in a search and secure must perform a thorough search of any place a person could reasonably fit. Remember that an injured person may not be able to alert an operator to their presence, and worse, an unconscious person may have fallen into an area not normally accessed by people.
- **The Secondary Objective is to ensure the enclosure's interlock system is intact and operational.** Operators must check that each gate and door latches securely, that fences are secured, and that all interlock hardware such as scram switches, mechanical and magnetic door switches, and light links will drop an enclosure's interlocks if activated. If an operator finds any part of the interlock system faulty or compromised during a search and secure, the operators must stop their secure and notify the Crew Chief. The Crew Chief will then notify an RSO or the interlock group.
- **No other work shall be attempted during a search and secure.**

## **Who can perform a Search and Secure?**

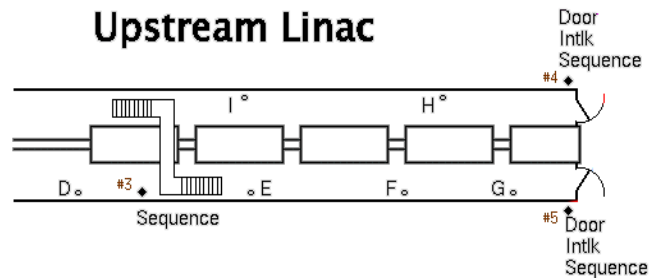
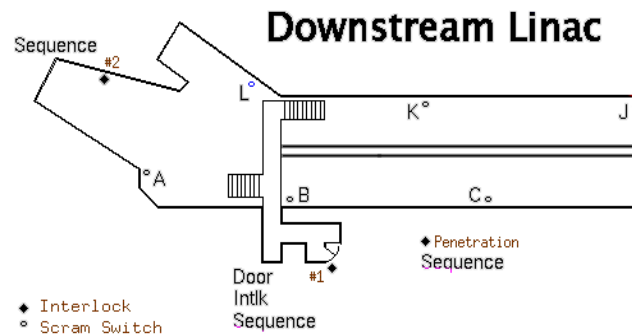
- **Only operators who've had search and secure training and are controlled access qualified can perform a search and secure of an enclosure.**
- Other operators who've had controlled access training, but are not qualified to perform a search and secure may, with supervision, participate in a search and secure.

## Who can perform Safety System Repairs?

- Only the BD ES&H Interlock Group is authorized to work on the safety system.
- Use the call-in list for emergency repairs.

## Requirements

- Minimum of Two Operators
- Search and Secure Maps, as necessary
- Controlled Access Keys
- Reset Key
- Film Badge & Dosimeter



All enclosures require a minimum of two operators to interlock; some areas may need more operators.

The search and secure maps detail the required amount of operators needed for interlocking, the sequence for completing the search and secure, and all other necessary information related to the enclosure.

Each operator must have a controlled access key to the enclosure before beginning the interlock.

At least one operator must have a reset key.

You must have a film badge and dosimeter.

You may also need other equipment such as ODH monitors or special clothing. The documents you need to check before entering any enclosure are:

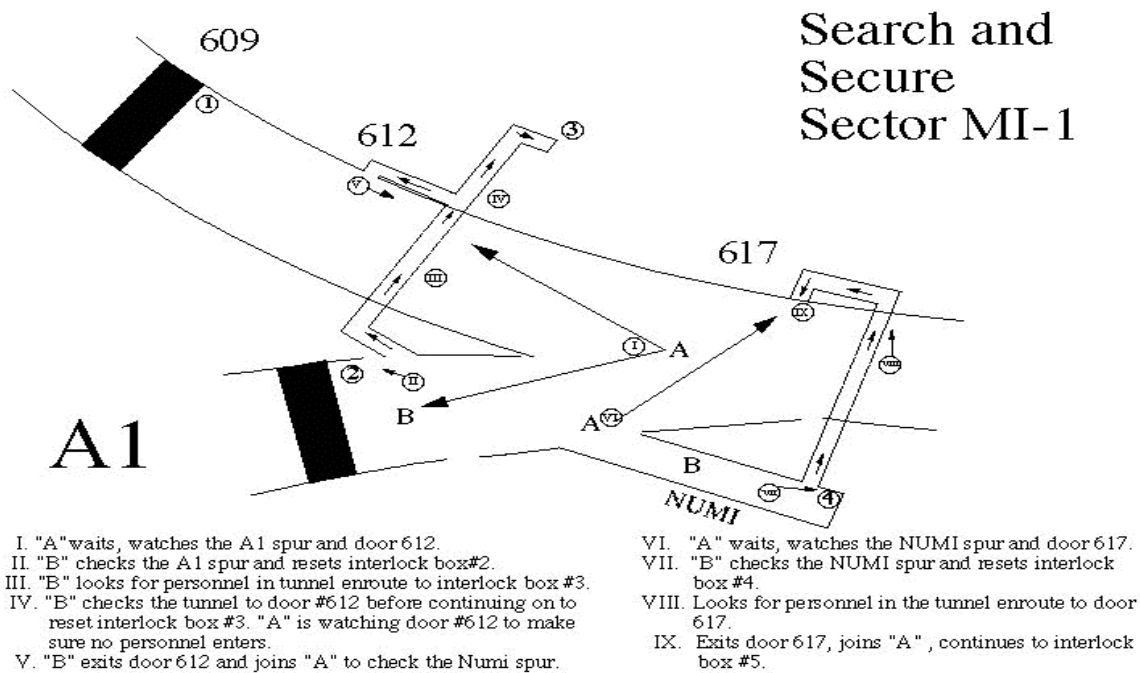
- RWP (Radiation Worker Permit)
- Search and Secure Maps
- SAB (Special Access Binder) \*This name may change.

Thoroughly search the enclosure. This search includes the areas on top of, underneath, inside, and behind all enclosure equipment. It also includes checking sump holes, stairways, stairwells, on top of cable trays, in storage areas, and spur lines.

Search any place a person could reasonably fit.

## Important Instructions

# Holding the Secure

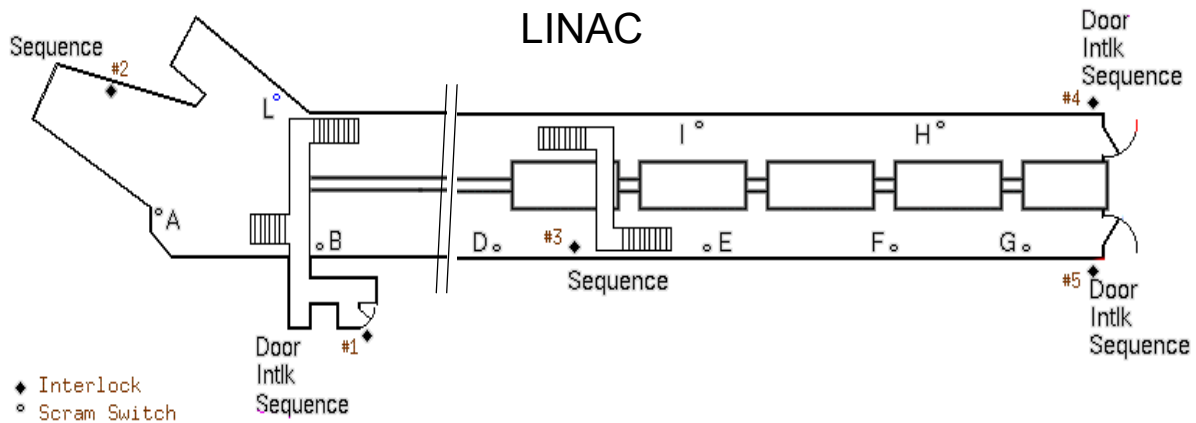


There are instances when a search and secure team must split up to check a dead end or a door access. **The hold position stops a person from getting into a searched area without being seen.**

During these times, one operator must hold the secure at the place designated on the search and secure map until the other operator returns. Or one operator may search ahead until reaching a specific position to hold the secure (again, as designated by the search and secure map), until the other operator catches up.

## Important Instructions

# Interlock Sequence



Search the enclosure according to the sequence indicated on the search and secure map. This assures that an area has at least been walked through.

The map provides a sequence of interlock boxes to follow. (Be aware that unlike the accelerator areas and switchyard, the external beam line interlocks don't allow checking a door or gate after the interlock box has been made up.)

### Verify the Interlock System.

Verify the integrity of the interlock system by checking door and gate latches, "A" (hardwire) and "B" (logic) loops, safety switches, and light links.

See the "Interlock Testing" note on the next page.

Report all failures or irregularities of the system to the Crew Chief.

### Enclosure Interlock Signs

Verify that the "Enclosure Interlocked" sign is flashing. Notify the Crew Chief if the sign isn't flashing. This is the final part of the interlock sequence.

## Safety Dummies

**First, read and follow any instructions posted on the dummy.**

If you discover a safety “dummy,” and it has no specific instructions, note its location and carry it with you while continuing the search and secure. Return the dummy to its designated BD/ES&H location. If there are no instructions on the dummy, note its discovery in the MCR logbook and contact an RSO.

## Technical Information

### **Critical Devices**

A critical device is a specifically designated power supply, beam stop, collimator, or other device that permits and controls the transport or acceleration of a particle beam into an enclosure.

### **Critical Device Failure**

A critical device failure is when the safety system senses a critical device to be in a state or position that may allow beam into an enclosure without a beam permit. For failures, the system drops the permit for an upstream critical device.

### **Coasting Beam Safety System**

The purpose of the coasting beam safety system is to protect personnel from stored beam in adjacent beam enclosures.

### **Safety System Status**

The safety system computer has a status terminal in the MCR. This terminal will show you the present state of the safety system.

### **Interlock Boxes**

- Head Box: The last box in a sequence of boxes that sums up the “A” (hardwire) loop and “B” (logic) loop for the enclosure.
- Door Box: Any box associated with door, gate, or light link switches.
- Watchman Box: Any box not associated with a switch.

### **Interlock Testing**

Accelerator enclosures, including Switchyard and Meson, but excluding the other unused external beamlines, should have all their interlocked doors, gate switches, and light links tested during a search and secure. Remember, when testing the head box of an enclosure, the reset key must remain turned while opening the door or gate or the whole enclosure will drop. MI and Switchyard have a display that specifies when the head box of the interlock system is tested. There is no need to hold the key.

### **Ground Fault Circuit**

A ground fault is a conductance to ground from a safety system cable. This problem is dangerous because two or more ground faults could bypass an interlock system.

### **Chains**

Part of your search and secure of an enclosure includes checking that certain areas are locked and chained closed.

### **Redundant Loops and Circuits**

- The “A” loop is the electrical hardwire loop through all the door switches in the enclosure.
- The “A” circuit is the summation of the “A” loop, ground fault circuit, and keys.
- The “B” loop is the logic loop through all the interlock box sequence relays in the enclosure.
- The “B” circuit is the summation of the “B” loop, scram switches, and keys.

### **Light Link**

The light link switch is actually an infrared beam that drops when the beam is broken.

### **Crash Button**

In the Main Injector, TeV, and Switchyard crash buttons have taken the place of scram switches.

In PPD Experimental Halls, analyzing magnets often have crash buttons that inhibit their power supplies.

### **Switches**

There are mechanical switches and magnetic switches.

### **Scram Switch**

Scram switches are located only in the LINAC and Booster enclosures.

### **Emergency or Scram Loop**

The Emergency or Scram loop allows a person to crash beam permits from inside an enclosure.