national accelerator laboratory

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LINAC INTERLOCKS, SEARCH-AND-SECURE PROCEDURES, AND ACCESS CONTROL

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A. Interlock Chain. There are five doors to the linac tunnel:

(i) Labyrinth door at 200-MeV end

(ii) Air door (air-pad shielding door at approximately the 66-MeV point)

(iii) 37-MeV door

(iv) Bridge door (leads onto a bridge over 750-keV transport

(v) 750-keV door (below bridge door).

These doors are all part of the hardwire interlock chain. The chain has, in addition, light beams at each door, a key tree with 16 entrance keys, a master reset key, and 11 scram switches in the tunnel. The interlock chain is also connected to the preaccelerator, booster, and main-accelerator interlock chains.

The linac is inhibited by a beam stop in the 750-keV transport line and by a pulse shifter that moves the preaccelerator beam pulse to a time outside the rf pulse. The linac is inhibited unless

1. All five doors are closed and reset (including light beams)
2. Scram switches are armed
3. No ground faults exist in the interlock chain

4. Booster is safe (booster search and secure complete or transport septum off so that beam cannot go down to booster enclosure.

5. Main accelerator is safe (search and secure complete or 5° bend between booster and main accelerator is off so that beam cannot go to the main accelerator.

B. Search-and-Secure Procedure. The search and secure is carried out by a two-man team, who carry entrance keys and the master reset key. Their first step is to lock the air door, which can only be accomplished from outside. They then enter through the labyrinth door, search the 200-MeV area, then proceed back toward the low-energy end of the linac. They test each door and light beam and reset again, then lock it. They exit at the low-energy end, locking the doors. When they make up the key tree and reset the master key in linac control, there is a 20-second siren and a 1-minute recorded message.

The preaccelerator, which has only one door, is searched and secured separately.

C. Controlled Access. The master reset key is used to open the key tree, from which each person takes an entrance key .

This key will unlock any door but the person must enter and exit through either the labyrinth or bridge door and not keep open for more than 30 seconds. Opening any of the other doors or keeping these doors open for more than 30 seconds will trigger a search and secure.

There are special crash locks on the labyrinth and bridge door for emergency access. These, of course, inhibit the linac.