



BOOSTER ACCESS CONTROL SYSTEM

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Safety Statuses

There will be two distinct radiation safety statuses. These are "open status" and "closed status."

The requirement for open status is that it shall be impossible to inject any beam from the linac into the booster enclosure. Specifically, this condition requires one of two situations: either

- a) the linac is in open status, or
- b) the beam chopper and septum magnet are both locked off and a two inch thick steel beam stop is in position in the 200 MeV diagnostic area.

The conditions for closed status are:

- 1) A search and secure has been completed and all interlocks have been checked and set.
- 2) A two minute warning message has been sounded stating that anyone still in the enclosure must pull the emergency stop cord and leave immediately.

- 3) Either (a) the main ring is in closed status, or (b) bending magnets have an interlocked-setting and/or a physical beam plug is in position in the 8 GeV transport system making it impossible to inject 8 GeV protons into the main ring.

Access During Periods of Closed Status

When the Booster is in closed status, access will be limited to personnel engaged in essential operations and maintenance. Any break in the access interlock chain returns the booster to open status and requires that a search and secure be performed up to the undisturbed interlocks before operation continues. There are eight access points to the booster enclosure (Figure I). Doors 05 and 09 at the south side of the booster will not normally be used except as emergency exits and entrances. Consequently, these will be locked and interlocked, but for emergency use, they will be equipped with a crash-bar type of opening from the inside and a "break glass" entry facility from the outside. Gate 14/16 will also be locked and interlocked, and used only during an open status. The remaining five entrances will be equipped with an interlocked radiation door (gate). These entrances are marked Door 02, 12, 14/16, 21 and Gate 19 in Figure I. Three light beam interlocks partition off sections of the ring (03, 11, and 18). The remaining six light beam interlocks are associated with the five unlocked entrance doors.

Each of these five radiation doors will be equipped with a two section sign.

Radiation
Intlk Set
Do Not
Enter

The top portion is automatically illuminated when, and only when, the door interlock is set. The lower portion is illuminated when Linac can accelerate beam and the beam stop is out of the beam line.

Access to the enclosure will be based on the following system. Alongside each door there will be a cabinet containing 16 keys. These keys form part of the hard-wired interlock chain. Whenever any part of this chain is broken, chopper and septum power is removed and the beam stop falls into the beam line. Thus, removal of one of these keys prevents 200 MeV beam from reaching the booster enclosure. Every person entering the enclosure during closed status takes one of these keys and the key is held in place in an "override box" while the person passes through either a radiation door or one of the light beams.

Search and Secure Procedure

Two people perform the search and secure as follows (Figure I). Taking one key each they enter Door 02 and proceed to Light Beam 03. A sign is then placed at the upstream of the interlock stating that a search and secure

is in process, use a key to pass through the interlock. With a unique key they then check and set the interlock and proceed counterclockwise around the ring. Continuing counterclockwise, and inspecting under every module, they reach the stairway to Door 05 where one man remains by the magnet ring while the other ascends the stair to the top door to check and set the interlock. They both continue counterclockwise repeating this procedure at Door 09. This procedure is repeated at each access point and light beam around the enclosure. At the extraction area one man remains by the magnet ring while the other searches to Light Beam 14. This second man then checks and sets this interlock and continues searching to Gate 14/16. After checking, setting, and locking this interlock he uses his key to pass through Light Beam 14. After checking and setting Door 14/16 he proceeds to Light Beam 16. The first person then also proceeds to Light Beam 16. During the search each person encountered is checked to establish that he has a key. Anyone not holding a key must accompany the search party and leave by the next exit.

Finally, the search party reaches Light Beam 02. One person then searches to Light Beam 03. If that interlock is still set, he removes the sign and returns to, checks, and sets Light Beam 02. They then check and set Door 02, use their override keys to pass through the door and return their keys to the cabinet. After the search and secure has been completed and

all keys are returned to their cabinets, a two minute audible warning message in the enclosure is initiated from the main control room. Once the warning message is completed the unique (master) key can be used to "latch up" the hard-wired interlock chain enabling the safety stop, beam chopper, and septum magnet.

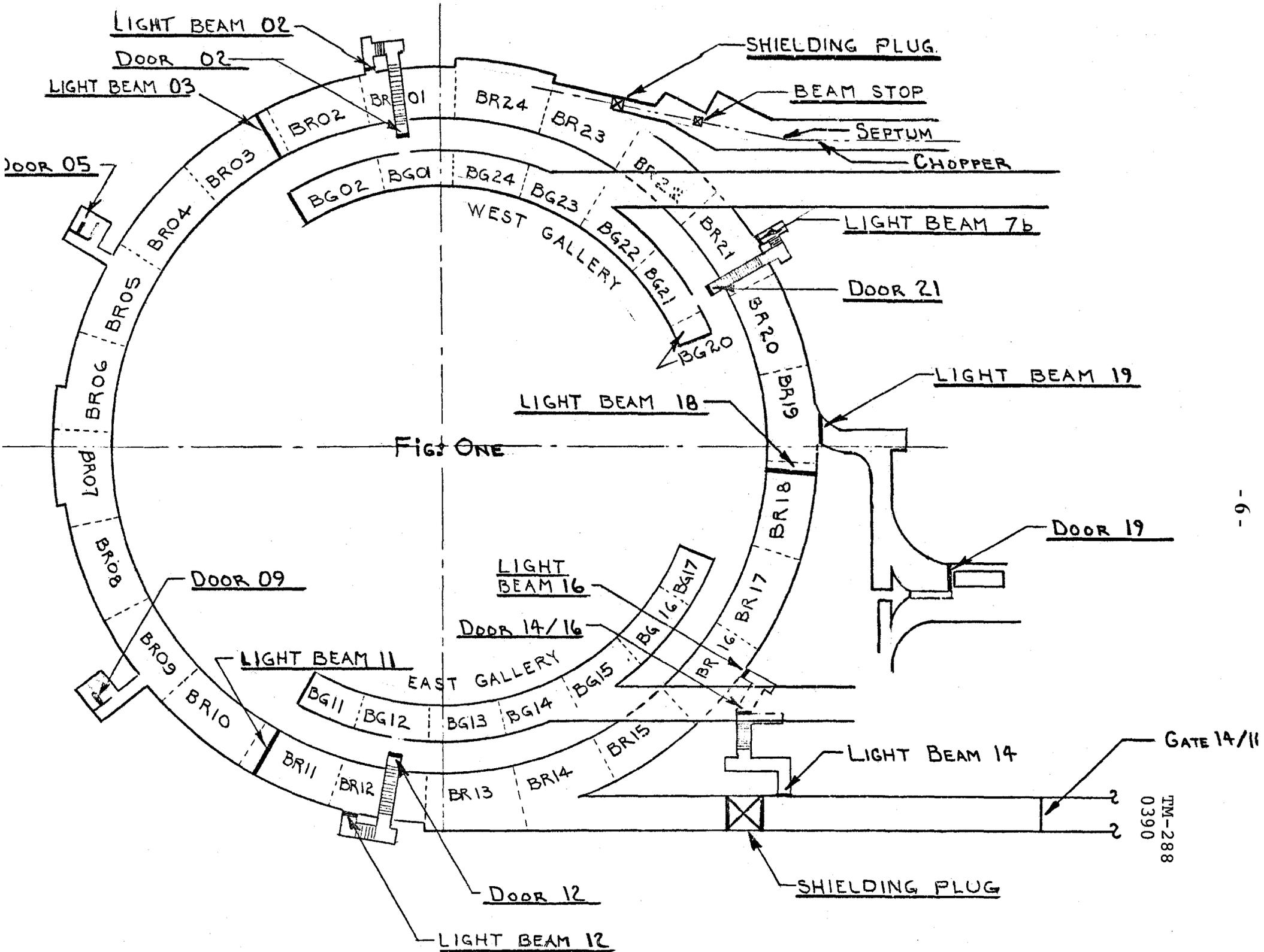


Fig: ONE

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