

MCR Operator Training

Access to Primary Enclosures

OPM 4.1

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Making Access to a Primary Area

- **Primary Area**
 - *any interlocked enclosure designed to prevent access to uncollided or primary beam (OPM 2.16)*
- *Control of access necessary to prevent exposure to potentially lethal radiation from particle beams and other hazards present in an accelerator*
 - Unanticipated radiation exposure from activated and contaminated components
 - High electric and magnetic fields and their associated voltages and currents

Primary Areas in the C-A complex covered by this procedure

- *Accelerators*
 - LINAC



Primary Areas in the C-A complex covered by this procedure

- *Accelerators*
 - LINAC
 - Booster



Primary Areas in the C-A complex covered by this procedure

- *Accelerators*
 - LINAC
 - Booster
 - AGS



Primary Areas in the C-A complex covered by this procedure

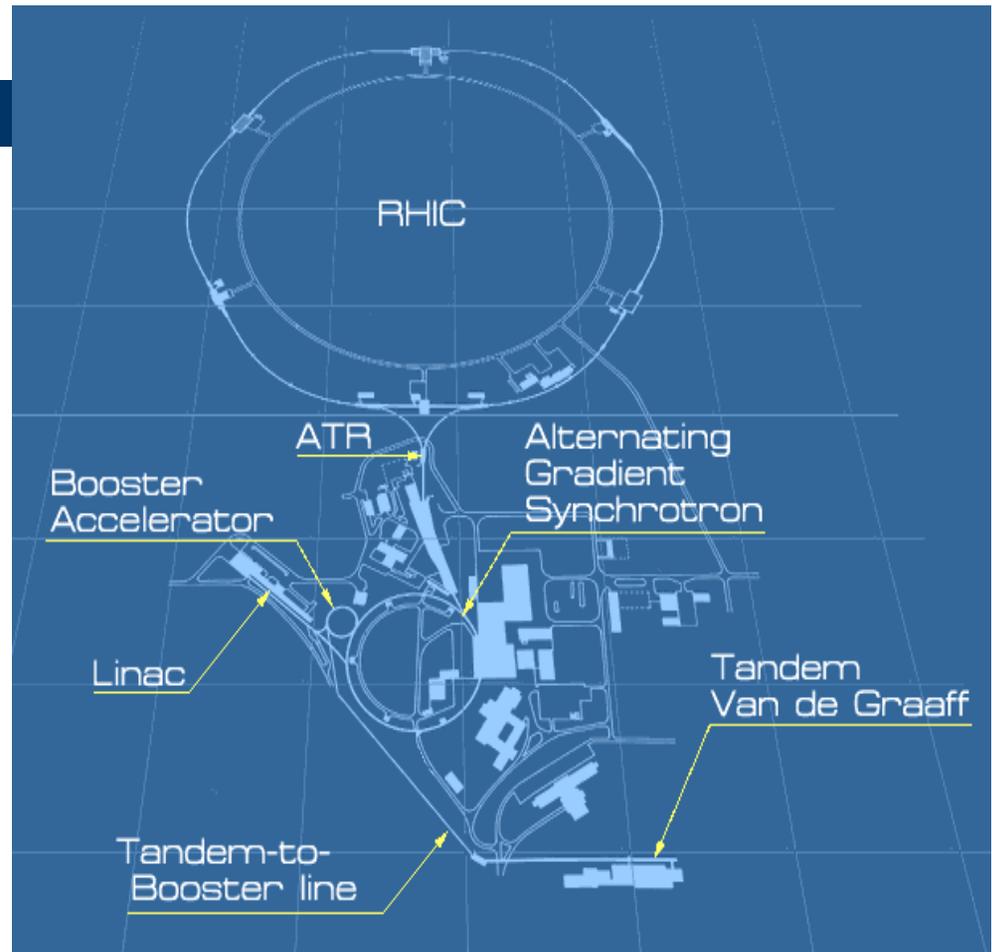
- *Accelerators*

- LINAC
- Booster
- AGS
- RHIC



Two Types of Access Control Systems:

- *Conventional Relay Logic*
 - AGS
 - Booster
 - SEB
- *Particle Accelerator Safety System (PASS)*
 - RHIC
 - ATR



Access States

- **No Access**

- No access permitted
- Beam operations are imminent or ongoing
- All critical devices are on

- **Controlled Access**

- Access to enclosure permitted and controlled by gatewatch and key system
- Entrants must sign in and out with gatewatch
- Beam off
- All critical devices turned off
- For Booster and AGS, operations LOTO applied

Access States

- ***Restricted Access***

- Access is restricted to those with appropriate training for area
 - Training signified by possession of appropriate key or keycard
- No gatewatch needed for restricted access
- All critical devices turned off
- For Booster and AGS, operations LOTO applied

- ***Other States***

- Experimenter Access
- Safe Access

How Access Control Works

- Beam to an area is turned off
- For the AGS and Booster, operations LOTO is applied
- The area is switched from the *No Access* state to *Controlled Access*
- For the Booster, AGS, and RHIC, Health Physics survey for radiation is completed
- For Controlled Access, entrants sign in with the gatewatch to enter a particular area
- Entrant either presents token or obtains and uses token key to enter particular area after obtaining a release from the gatewatch

How Access Control Works

- **Tokens**
 - **AGS Token**
 - *Held by gatewatch*
 - *Lab ID Card, RW-1 Card, RCT Qualification Card*
 - **PASS Token**
 - *Held by entrant*
 - *PASS CA key appropriate for a given enclosure*
 - *Obtained from MCR*
- When leaving area, entrant either walks through gate, signs out, and retrieves token or asks for release, returns token, and signs out
- Gate is closed

Responsibilities

- Gatewatch accounts for all people who enter and exit enclosure
- Radiological Control Technician (Health Physics) performs surveys to determine radiological conditions inside enclosure
 - *RCT must always be first to access AGS, Booster, and dump areas in RHIC (W-dump and beam dumps in 10 o'clock!)*
- Operations coordinator approves and initiates both access and resumption of beam operations
- Entrants responsible for observing and obeying radiological postings and other warnings

Gate Watch Logs

- C-A Gate Security Log Sheet Form

C-A GATE SECURITY LOG SHEET

Sheet No. ___ of ___

- 1) (Check one) Shift (0001-0800) _____ Shift 2 (0801-1600) _____ Shift 3 (1601-2400) _____
- 2) Gate name _____ Date _____
- 3) Opened _____ (time) By (signature): _____
- 4) Confirmation of RCT (HP) Survey at Initial Entry (signature) _____
- 5) Locked _____ (time) By (signature): _____
- 6) Gate log reviewed by OC (signature) _____
- 7) Sweep Required (4 hrs / 26 entries): (Check One) ___yes ___no OC concurrence (signature) _____

	NAME PRINT	write ID / CA #	DESTIN -ATION	ENTRANT'S SIGNATURE IN	WATCH INITIAL IN	ENTRANT'S SIGNATURE OUT	WATCH INITIAL OUT	REMARKS
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								

Gate Watch Logs

- Remote Gatewatch with Iris Scanner

C-A Electronic Gate Security Log Sheet for Remote Access
for use Only With Remote Key Tree (Gates: BGE1, 12GE1,
6GE1, 8GE1, 10GE1, 12GE1)

Select Shift 8/27/2004

Sweep Required

Select Operator Expr: NSRL

NO.

UserID	FirstName	LastName	Date	Time	Status	Watch
22xxx	FirstName1	LastName1	9/2/2004	4:30:23 PM	IN	OPR
22xxx	FirstName1	LastName1	9/2/2004	4:31:24 PM	OUT	OPR
22yyy	FirstName2	LastName2	9/2/2004	4:34:24 PM	IN	OPR
22yyy	FirstName2	LastName2	9/2/2004	4:41:49 PM	OUT	OPR
22xxx	FirstName1	LastName1	9/2/2004	4:49:37 PM	IN	OPR
22xxx	FirstName1	LastName1	9/2/2004	4:52:59 PM	OUT	OPR

Gate Watch Logs

- Backup Iris Scanner Sheet

**C-A GATE SECURITY LOG SHEET FOR REMOTE ACCESS
FOR USE ONLY WITH REMOTE KEY TREE (GATES: A3 / BGE1 / 2GE1/ 6GE1 / 8GE1 / 10GE1)**

Sheet No. ___ of ___

- 1) (Check one) Shift (0001-0800) _____ Shift 2 (0801-1600) _____ Shift 3 (1601-2400) _____
- 2) Gate name _____ Date _____
- 3) Opened (N/A for multiple NSRL/A3 access) _____ (time) By (signature): _____
- 4) Locked (N/A for multiple NSRL/A3 access) _____ (time) By (signature): _____
- 5) Gate log reviewed by OC (signature)(N/A for multiple NSRL/A3 access) _____
- 6) Sweep Required (4 hrs / 26 entries): (Check One) ___yes ___no
 OC concurrence (signature) (N/A for multiple NSRL/A3 access) _____

	ENTRANT (LAST) NAME PRINT OR SIGN IN/OUT IF MCR CA KEY	ENTRY TIME IN (24 hour clock)	WATCH INITIAL IN	EXIT TIME OUT (24 hour clock)	WATCH INITIAL OUT	MCR CA KEY (X)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

Types of Gatewatch

- Local gatewatch
 - Gatewatch stands at gate and controls entry
- Remote gatewatch
 - Gatewatch monitors entry and exit into particular gate from camera and communicates with entrants via telephone
 - At certain gates, entrant may authenticate using iris scanner and then signed by the remote gatewatch
 - *Used only where remote key trees are located*
 - RHIC experimental areas
 - NSRL target area
- In both cases, gatewatch can give a release to open the gate
- In remote gatewatch, entrant must call for release to leave gate

Changing State of an Enclosure

- For relay system (AGS, Booster, SEB, LINAC)
 - Insert key into appropriate key switch
 - Simultaneously press button and turn key
 - Release button and key

Changing State of an Enclosure

- For PASS system
 - To change from NA to CA
 - *Turn off critical devices*
 - *Display the region into which access is to be made on the touch panel*
 - *For RHIC, select the appropriate peer selector*
 - *Press and hold the CA pushbutton on the panel*
 - *Momentarily press the “Mode Permit” button when the panel indicates that the mode permit can be sent*
 - *Release the CA button*

Changing State of an Enclosure

- To change from XA or RA to CA
 - *Close any door to the enclosure that might be open*
 - *Select the appropriate peer selector*
 - *Press and hold the CA pushbutton on the panel*
 - *Momentarily press the “Mode Permit” button when the panel indicates that the mode permit can be sent*
 - *Release the CA button*

Controlled Access Gate Entry

- OC makes safe the enclosure by turning off appropriate critical devices or “beam switches”
- Allow for cool down time
 - 15 minutes for LINAC
 - 30 minutes for SEB target cave or BLIP spur
 - 30 minutes for protons in RHIC ($I_{\text{AGS}} > 5 \times 10^{12}$ ppp)
 - 0 minutes for heavy ions
- Set enclosure to Controlled Access
- Perform operations LOTO for AGS and Booster rings

Controlled Access Gate Entry

- Fill out header to gatewatch sheet
 - Gatewatch inserts appropriate gate key into switch and turns while obtaining a simultaneous release from MCR to unreset and open gate
 - For PASS system, entrant calls MCR and requires a simultaneous release while turning CA key
 - Gatewatch must remain at gate or monitor camera at all times while entry is made into enclosure or until formally relieved

Survey Requirement

- **The first access into a primary beam enclosure following a machine evolution shall be to perform a radiological survey**

Waivers

- Survey requirement is waived for low intensity operations (heavy ions and/or polarized protons in
 - *RHIC (except zones 9z1 and 10z2)*
 - *NSRL experimental area and transport line*
 - *U-line (U-upstream and U-downstream)*
 - *OC may request a survey anytime it appears warranted*
- If small group (five or less) is going to one location in enclosure, then RCT may accompany them only if the RCT precedes them to destination
- After RCT approves entry, access is permitted

Relieving the Gate Watch

- Gate watch should change roughly hourly
- Relief must be trained in gate watch procedure
 - Step by step review of procedure conducted by properly trained member of shift operations group
- Reliever should sign in on Security Log Sheet
- Assume control of all tokens
- Only members of shift operations group shall act as trainers
 - Only MCR/CAS personnel may relieve gatewatch at remote access console (MCR7)

Resetting Gate

- Occurs after all entries are completed
- Verify all entrants who signed in have signed out
- Verify that all tokens have been returned
- Reset the gate
 - PASS gates are reset remotely
- Contact MCR to verify that they have a gate reset indication
- Insert but do not capture Reset/Enable key (LINAC, AGS, Booster, Switchyard) in panel or give key to OC

Closing the Gate Log Sheet

- *Closing the Gate Log Sheet*
 - Gate watch shows OC log sheet to indicate that all personnel have been accounted for
 - OC performs independent review of log sheet
 - OC determines if sweep is required and signs log sheet
 - OC resets redundant reset where required
 - Log sheet is filed in Gate Security Log binder in MCR

Gate Entry with No Gate Watch

- Prior to entry, prepare the gate log sheet
- Assemble all entrants at gate
 - No more than six persons may enter
 - *RCT*
 - *SOP member*
 - *Four others*
- Entrants must not leave enclosure without the SOP opening gate and without signing out
- Group enters in front of SOP member

Gate Entry with No Gate Watch

- SOP member unreset gate and receives simultaneous release from MCR
 - No keys required by entrants other than SOP member
 - For LINAC tank 1 and SEB enclosure SOP member shall “home” bolt by turning key in keyswitch on gatebox inside the gate
 - Confirm that gate did not reset
 - After entries are complete SOP accounts for all personnel on security log sheet
 - OC reviews and approves log sheet and resets redundant reset as required
 - Log sheet is filed in log book

Restricted Access Entry

- Apply restricted access LOTO to Booster and AGS
- Establish controlled access to allow RCT to perform radiological survey
- After RCT approves, enclosure may be set to restricted access