If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the ESSHQ Procedures Coordinator, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

5.30 Verification and Operation of Beam Permit Links

Text Pages 2 through 5

Attachments

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

P. Ingrassia, G. Marr

5.30 Verification and Operation of Beam Permit Links

1. Purpose:

1.1 Introduction to the Beam Permit Link System

The Beam Permit Link System consists of four Beam Permit Links: AGS, UVW, Booster, [XY] Arc, and RHIC. These links are chains of computer inputs linked to one another, designed to inhibit beam operations when one of the input's criterion is not satisfied. When an input's criterion is not satisfied, the input is said to "pull" the link, and the link is said to go "down." The four links are not entirely independent from one another. Different links may have common inputs, or the input criterion of one link may be that another link is up. When the links go down, critical devices inhibit beam injection. In order for the critical devices to return to an operational state, either the permit input criterion must be satisfied, or the link input must be disabled.

1.2 The purpose of this procedure is to verify the beam permit link system is properly configured prior to each run of every scheduled mode of accelerator operation, to initialize that system prior to commencing operation, and to make provisions for altering the inputs during operation.

2. Responsibilities

2.1 The Controls Group is responsible for maintaining the hardware and software associated with the beam permit link system.

2.2 The MCR Group Leader (MCRGL), or designee, is responsible for verifying the beam permit link system is properly configured prior to each run of each scheduled mode of operation.

The beam permit link system input configuration for a particular mode needs to be verified only once each run.

The beam permit link system must be properly configured before each run.

2.3 The Operations Coordinator is responsible for determining when temporary alterations should be made to the beam permit link system, for documenting the reason(s) for altering the beam permit link system in the OC log, and for notifying the MCRGL of the alterations.

3. Prerequisites

3.1 The Beam Permit System hardware is operational.

4. Precautions

4.1 Great care and diligence must be exercised in the alteration of the beam permit system input masks. The beam permit system exists to protect personnel and equipment throughout the Collider-Accelerator Complex.

> **Warning:**
> Disabling beam permit link input masks could cause damage to equipment and excess facility downtime.

5. Procedure

5.1 Verification of Beam Permit Link System

Prior to the first time the Booster beam-stops are opened for a specific run, the MCRGL, or designee, shall determine the appropriate configuration of the Permit Link inputs, based upon guidelines found on the operations wiki PERMIT LINK web page. "Proper" configuration depends upon the program that will be running, including the particle species and the accelerators and beamlines that will be used.

5.2 Initialization of the Beam Permit Link System

Prior to the first time the Booster beam-stops are opened for a specific run, and after the Beam Permit Link System has been verified, the MCRGL, or designee, shall implement the Permit Link System inputs determined in 5.1 above. This implementation is the process of enabling and disabling the Beam Permit Links and their inputs. This process is completed by using parameter editing tool (pet). Once the Link System has been properly initialized, the ability to enable or disable a permit input shall be locked so that no further manipulation of the system can be made, and the integrity of the system shall be preserved (see attachment 8.1).

5.3 Provisions for Changing the Beam Permit Link System During Operations

Occasions may arise when the previously established Permit Link System inputs need to be altered.

5.3.1 IF the MCRGL finds reason to alter the previously established Permit Link System input masks, THEN the MCRGL, or designee, shall edit the permit link inputs and lock them (see attachment 8.1).

5.3.1.1 The MCRGL shall inform the OC's of the change by making an entry in the OC Shift Log.

5.3.2 If the Operations Coordinator finds reason to alter the previously established Permit Link System, or if the OC is asked to alter the Permit System inputs by the Run Coordinator, or designee, then the Operations Coordinator shall:

5.3.2.1 Change the Beam Permit Link System using the procedure outlined in attachment 8.1.

5.3.2.1.1 The OC may change any Permit link input after he/she reviews the function of the input and the consequences of a mistake. The review will be with the system engineer for the system to be masked/unmasked.

5.3.2.1.2 The "standard mask" criteria, determined with the help of the appropriate "liaison physicists" is found at http://www.cadops.bnl.gov/AGS/Operations/OpsWiki/index.php/Permit_Link

5.3.2.1.1.1 IF the permit inputs are from the Access Controls System, then the OC may mask them at his/her discretion and proceed to step 5.3.2.2.

5.3.2.1.3 No hardware or administrative restrictions, other than those outlined in this procedure, are placed on the OCs when editing Permit inputs.

5.3.2.1.4 Periodically the MCRGL, or designee, shall look at the description for the file http://www.cadops.bnl.gov/AGS/Operations/OpsWiki/index.php/Permit_Link , to determine if it has been edited in violation of the notification requirements of paragraph 5.3.2.3.

5.3.2.2 Document in the Coordinators Log, as well as the appropriate Machine Log, the reason(s) for altering the Permit Link System.

5.3.2.3 e-mail the MCRGL to inform them of the changes.

5.3.3 If the Permit Link System has been altered by Operations Coordinator, the MCRGL shall determine whether the changes should be temporary, and if necessary, reconfigure the Beam Permit Link System.

6. Documentation

6.1 Operations Coordinator's Log

7. References

7.1 The operations wiki Permit Link Web Page:
http://www.cadops.bnl.gov/AGS/Operations/OpsWiki/index.php/Permit_Link

8. Attachments

8.1 Altering Beam Permit System Input Masks.

Attachment 8.1

Altering Beam Permit System Masks

Documentation of the Beam Permit Link System, including Permit Link inputs and their configuration for different modes of operation, exists at the Permit Links Main Page at:

http://www.cadops.bnl.gov/AGS/Operations/OpsWiki/index.php/Permit_Link

I. Using BisConfig application to manage permit input locks and masks.

The BisConfig application can be used to modify permit link inputs. Via this interface, one can enable and disable inputs, choose which inputs are always on (i.e. “locked”), and modify event masks. This is preferable to manually modifying the “alwaysOnMasks” file (see II. below). Note that the application must be launched from an account in the “operations” group, modifying locked inputs as mcr is not permitted. Refer to the program overview http://www.cadops.bnl.gov/Controls/doc/BisConfig/BisConfig.html for more details regarding its use.

II Using the file "alwaysOnMasks" - locking and unlocking

Whether a permit input can be disabled using Parameter Editing Tool (PET) is controlled using the file "alwaysOnMasks". The file "alwaysOnMasks" is found in the following directory: /operations/app_store/permit/ This file may only be edited by members of the "operations" group, including the operations coordinators, morris, satogata, ahrens, olsen, whalen, trbojevic. Further, the user must be logged in under their private account to edit the file.

This file has the following format:

permit.10a-ps3.A	00000011
permit.10a-ps3.B	00000011
permit.911-agsbi1.A	00000011
permit.wh-ps2	01101111

The first string is the name of the Front End Computer (FEC). Each FEC has eight inputs, for RHIC FECs, the last two inputs are Quench Link inputs. The second field in this file is a series of binary digits representing each of the eight inputs respectively. If the number is "0", the respective input may be disabled using PET. From the sample file shown above, inputs one, and four on the FEC permit.wh-ps2 are configurable using PET. If the number is "1", the input is set into an enabled state which cannot be disabled by using PET. We see on FEC permit.wh-ps2 inputs two, three, five, six, seven, and eight are put into an enabled state and locked there so that they cannot be changed through PET. The last two inputs on permit.wh-ps2, inputs seven and eight, are Quench Link inputs. These Quench Inputs are incapable of being disabled regardless of their setting in this file.

An important distinction is made between the setting of "0" and "1". The "1" setting forces the input to be enabled and prevents it from being disabled, while the "0" does not change its state, only allows the state to be manipulated using PET.

TO DISABLE A PERMIT INPUT:

1. OC logs into their personal account on the Controls System
2. OC checks out the file /operations/app_store/permit/alwaysOnMasks
3. OC edits the file alwaysOnMasks and changes the appropriate input setting from "1" to "0".
4. OC saves the file and checks it back in.
5. OC causes the ADO to read the file. Do this by typing:
   adolf *FEC_Name* inputAlwaysOnM
   where *FEC_NAME* is the name of the FEC (i.e. permit.wh-ps2, permit.10a-ps3.A,etc.)
6. OC Uses pet/RHIC LinksPermit, set the appropriate input to "disable"

TO ENABLE A PERMIT INPUT:

1. OC logs onto their personal account on the Controls System
2. OC checks out the file /operations/app_store/permit/alwaysOnMasks
3. OC edits the file alwaysOnMasks and changes the appropriate input setting from "0" to "1"
4. OC saves the file and checks it back in
5. OC causes the ADO to read the file. Do this by typing:
   adolf *FEC_NAME* inputAlwaysOnM
   where *FEC_NAME* is the name of the FEC (i.e. permit.wh-ps2,permit.10a-ps3.A,etc.)

III Unlocking Beam Permit Link PET Pages

All cells on a PET page are either editable or non-editable. The cells which set the permit inputs to "enable" or "disable" are non-editable by default. The non-editable setting is used so accidental changes in the permit link are minimized. Changing the editable status of cells on PET pages is outlined as follows:

1. Highlight cells by right clicking on it.
2. On the PET page menu, select Edit\Set Cell Editable

The cell will now be editable and the enable/disable state can be changed. IF this page is reopened, then the editable status of the cell will return to the default setting of non-editable, but the enable/disable value will retain the last sent value.