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C-A OPERATIONS PROCEDURES MANUAL

11.2.5 PHENIX High Voltage System

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Collider-Accelerator Department Chairman Date

A. Franz

11.2.5 PHENIX High Voltage System

1. Purpose

The purpose of this document is to define the local Operating Procedures for the PHENIX High Voltage (HV) system, in addition to the Local Emergency Plan ([C-A-OPM 3.16](#)).

This Local HV Operation Plan will ensure:

- The safety of all personnel from risks associated with the operation of the PHENIX HV systems.
- Prompt notification of the appropriate RHIC and Facility Support specialists.
- The preservation and protection of the environment.
- The preservation of BNL facilities and equipment.

2. Responsibilities

2.1 During standard operation, there will be two levels of responsibility for the oversight of the PHENIX HV System.

2.1.1 PHENIX Shift Crew, during any data taking period.

2.1.2 Subsystem Experts, during period of commissioning, see [C-A-OPM-11.2.5.a](#).

2.2 During data taking, it will be the responsibility of the PHENIX Shift Crew to:

- Monitor the status and alarms for the HV system as described in the 'HV Users Manual'.
- In the event of an alarm or irregularity, contact an expert from the Expert Call list.

2.3 The second level of responsibility is the Subsystem HV Experts. It is the responsibility of these Experts to maintain the HV Systems in a safe operating condition. This includes:

- Verifying the readiness of the subsystems for HV,
- Turning on the HV according to the operating procedures described below,
- Posting any special instructions or notifications as required, and
- Carrying out any emergency actions, as prescribed in the Procedures section of this document.

3. Prerequisites

- 3.1 The HV Experts and Shift Leaders shall have read and have training in the following areas:
- C-A Department Local Emergency Plan, [C-A-OPM 3.0](#)
 - PHENIX Local Emergency Plan, [C-A-OPM 3.16](#)
 - BNL, Electrical Safety I (HP-OSH-150B)
- 3.2 All personnel working on any electrical system or equipment in the C-AD shall be familiar with BNL [SBMS Electrical Safety](#), BNL [SBMS Lockout/Tagout Implementation Plan](#), [C-A-OPM 1.5](#), “[Electrical Safety Implementation Plan](#)”, [C-A-OPM 1.5.3](#) “[Procedure to Open or Close Breakers and Switches](#)”, [C-A-OPM 2.36](#), “[Lockout/Tagout for Control of Hazardous Energy](#)”. C-AD will provide on-site/work specific training to individuals in the electrical safety aspects of their job functions and assignments.

4. Precautions

- 4.1 The safety of personnel is of primary importance. The experts shall take great care to ensure that the High Voltage Systems will be operated in a way that does not place personnel or equipment at risk of physical harm.
- 4.2 High Voltage System Precautions:
- 4.2.1 The HV power supplies are current limited at less than 1 per channel for the tracking chambers and 1mA for the photo-multiplier (PMT) based systems.
- 4.2.2 The distribution cards for HV contain hardware current limits. An insulating layer covers all HV points in order to eliminate the danger to personnel. When the IR is closed no barriers or warnings are required.

5. Procedures

- 5.1 The procedure to handle the HV system shall only be carried out by trained shift personnel or the HV experts.
- 5.1.1 HV System Procedure: In normal operations the experimental hall will be closed to personnel making access to any HV point impossible. Under such conditions, follow this procedure for turning on the HV:
- Check that the appropriate current limits are in place for the power supply. Each subsystem shall maintain a HV database, where the operating parameters of the HV settings are recorded. This shall include the current limits, target voltages, ramp rates, operating

voltages and currents, and trip tolerances. Verifying and changing these parameters is the responsibility of the subsystem HV expert.

- Check that the target voltage for each HV output line is appropriate. The first stage of bringing on the HV shall be a single incremental step in the ramp up. This is because the current trips are disabled during ramping, and in order to locate a short in the system, it is necessary to halt the ramping and check the current at the earliest possible stage.
- Check that the ramp up rate for each HV supply is appropriate.
- Begin ramping the HV up.
- If any of the HV supplies trips, disable all HV supplies for that chamber until the reason for the trip is understood.
- If there are no HV trips, verify that the operating currents are appropriate.
- Change the target voltage to the correct operating voltage for each system, as given in the operating database.
- Continue ramping up the HV.
- When ramping is complete, verify that the operating currents are appropriate, as given in the operating log.
- HV is ready for testing.

5.1.2 HV System Procedures: Turning off high voltage to a chamber:

1. Begin ramping the HV down.
2. Verify by the read back that the HV is off for this system.

6. **Documentation**

None

7. **References**

None

8. **Attachments**

- 8.1 [C-A-OPM 11.2.5.a “ Listing of Subsystem HV Experts”](#)