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 kept on file in the C-A ESHQ Training Office, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

2.6.8 Procedure for Controlling Equipment Testing in the AGS, Booster, and RHIC Enclosures During Shutdown Periods

Text Pages 2 through 7

Attachments

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

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

R. Zaharatos

2.6.8 Procedure for Controlling Equipment Testing in the AGS, Booster, and RHIC Enclosures During Shutdown Periods

1. Purpose

The purpose of this procedure is to provide direction for System Testing Coordinators and MCR Operators when testing equipment. The Maintenance Coordinator or Operations Coordinator ensure proper control of the equipment through the use of Lock Out/Tag Out (LOTO), especially for equipment which is not on the MCR LOTO list.

2. Responsibilities

2.1 The Maintenance Coordinator or designee shall approve all testing and work on new and existing equipment in the AGS, Booster, and RHIC Rings.

2.2 MCR Operators or Collider-Accelerator Support (CAS) personnel are responsible for

2.2.1 performing a cursory sweep of the ring enclosure for electrical safety

2.2.2 installing gate postings before testing begins and for the removal of gate postings at the end of each test period., see C-A OPM-ATT 2.6.8.f

2.2.3 controlling access to the AGS, Booster, and RHIC enclosures when the controlled access state is required for testing.

2.3 The System Testing Coordinator is designated by the responsible System Engineer, and is responsible for

2.3.1 initiating the approval process for testing new equipment, or changes to existing equipment,

2.3.2 for barriering all potential electrical hazards associated with their system before testing begins.

2.4 C-A Supervisors are responsible for notifying the Maintenance Coordinator of required work by their group in the Rings and adjoining cable tray systems during testing periods.

2.5 The MCR Group Leader is responsible for ensuring that new equipment is added to the appropriate LOTO checklist in the MCR after successful testing is completed.

3. Prerequisites

3.1 All personnel involved in working on any electrical system or equipment in the C-A shall be familiar with BNL ES&H Standards 1.5.0, 1.5.1, and 1.5.2. C-A will provide on-site/work specific training to individuals in the electrical safety aspects of their job functions and assignments.

3.2 Workers testing equipment in the AGS or Booster Rings shall remove their locks from the token box at the conclusion of the maintenance task.

3.3 Unless escorted under Permit "G", personnel working in the enclosure while systems testing is in progress shall have:

- valid C-A Access Training
- valid Electrical Safety, Lockout/Tagout, and Working Hot on Permit "B"

4. Precautions

4.1 All personnel shall ensure their own safety by following the standards, safety rules, and the training they receive. In general, all energy sources must be locked out and tagged. Working on or near energized sources, "Working Hot", is not permitted unless a valid working hot permit has been issued. Personnel shall utilize tools, instruments, equipment (e.g., proper connectors and proper ac line cords), etc., that are safe and proper for the job. If any part of a job appears unsafe to any individual, it is their duty to discontinue work and inform the supervisor, manager, ESH Coordinator, or the C-A ESHQ Division Head, of the unsafe condition.

4.2 All workers testing equipment in the AGS, or Booster Rings shall apply their safety lock to the token box before entering and remove it upon leaving the Ring enclosures, consistent with C-A OPM 2.6, 2.6.1, and 2.6.2.

4.3 Systems may be energized for the first time under Restricted Access conditions only if:

- they are barriered
- they are not distributed systems (strings)

4.4 Once the LOTO, according to C-A-OPM 2.6.4 is in place, the Maintenance Coordinator may change the state of the LOTO when he follows this procedure.

5. Procedure

The steps to follow for equipment testing are shown in a flow chart in Attachment 8.6.

Warning:
Due to the potential for electric shock, the power cables to each new device shall remain disconnected and Red Tagged by the System Testing Coordinator until they are approved for testing by the Maintenance Coordinator.

5.1 New Equipment Testing

5.1.1 The System Testing Coordinator for each system shall fill in the information in C-A OPM-ATT 2.6.8.a, "New Equipment Testing Checklist", for all system ring loads to be energized for testing and submit it to the Maintenance Coordinator or designee. More than one system may be tested during a shutdown, at the discretion of the Maintenance Coordinator, or designee. The LOTO History for New Apparatus Testing, C-A OPM 2.6.8.c shall be filled out and kept in the appropriate MCR LOTO Book.

5.1.2 The Maintenance Coordinator (MC), or designee, shall submit the New Equipment Testing Checklist (NETC) to MCR to initiate MC LOTO of equipment. The MC LOTO shall be performed with the System Testing Coordinator or designated System Specialist.

5.1.3 When MC LOTO of equipment is complete using C-AOPM-ATT 2.6.8.b, the MC shall initial the NETC in column2, (MC LOTO IN PLACE). The System Testing Coordinator may then connect the equipment to the energy source(s), and initial the NETC Column 3, (EQUIPMENT CONNECTED, READY FOR TEST).

5.1.4 The Maintenance Coordinator, or designee, shall ensure proper barriers, signs or watches are in place. The standard sign for posting equipment under test is shown in C-A OPM-ATT 2.6.8.f .

5.1.5 The Maintenance Coordinator shall ensure that appropriate messages are posted on the C-A status monitors for equipment under test. The MC or designee will then request removal of the MC LOTO and initial the NETC Column 4, (READY FOR TEST & REMOVAL OF MC LOTO). The System Testing Coordinator may then remove the system LOTO and inform the MC or OC that the system is ready for testing.

5.1.6 When appropriate, the Maintenance Coordinator shall ensure that the applicable Ring sleeve box is locked, and retain the key(s) in the MCR captured key locker.

Warning:
If it is determined that testing is required to be done on Controlled Access, the area shall be swept free of personnel and the access control system placed in the Controlled Access state before continuing with this procedure (See C-A OPM 4.1). The MC and/or OC will decide if it is necessary to station a watch at the equipment for initial testing.

5.1.7 If testing is performed under Controlled Access conditions, the MCR Operator or CAS technician may lock him/herself in the Ring to work with the group performing the test.

5.1.8 If the first-time test of the equipment is successful such that the voltages required under the test program have been attained, the System Testing Coordinator initials and dates the NETC, Column 5 (PASSED) and returns it to the Maintenance Coordinator

5.1.9 The System Engineer verifies that the system has been entered into the appropriate MCR LOTO checklist.

5.1.10 The MC ensures that signs and barriers have been removed and the area has been returned to previous conditions.

5.1.11 If further testing is required, THEN

5.1.11.1 The System Testing Coordinator may ask that further testing for that equipment be done under Restricted Access conditions.

5.1.11.2 The System Testing Coordinator initials and dates the NETC, Column 5 (FAILED, DISCONNECTED). Each test of the equipment requires approval of the Maintenance Coordinator, or designee, using the LOTO History for New Apparatus Testing, C-A-OPM-ATT 2.6.8.c.

5.1.11.3 If testing is performed under Restricted Access conditions, then an MCR Operator shall make a public address announcement before testing begins, stating that the system(s) is being tested.

5.2 With approval of the Maintenance Coordinator, during maintenance the operator or CAS technician shall unlock the AGS Temporary Lock Box to obtain the system(s) keys to those items that were LOTO (refer to C-A-OPM-ATT 2.6.8.a and OPM 2.6.8.b)

Note:
Only the portion of the system designated by the System Testing Coordinator(s) as ready for test in C-A OPM 2.6.8.a, shall be LOTO by the MC or designee at the end of each test period.

5.3 After completion of the testing for the shift.

5.3.1 The System Testing Coordinator shall immediately LOTO every connected system of C-A OPM 2.6.8.a using the LOTO checklist from C-A OPM-ATT 2.6.8.b, and the LOTO History for New Apparatus Testing, C-A OPM-ATT 2.6.8.c.

5.3.2 The System Testing Coordinator shall place the keys in the appropriate Lock Box FOR THAT SYSTEM.

5.4 Testing of Existing Systems

5.4.1 Existing systems may be tested during Restricted Access if any of the following conditions are met:

5.4.1.1 Approved barriers or watch person stationed at equipment to be tested.

5.4.1.2 Barriers or covers are in place.

5.4.1.3 Strings may be tested if they meet the barrier conditions of 5.4.1.1 for Class A operation. That is, they are less than 50V DC or less than 10 VAC RMS or less than 10 joules stored energy.

5.4.2 C-A OPM-ATT 2.6.8.d, LOTO History for Existing Equipment Apparatus Testing, is filled out before the test. Note that the form may be used repeatedly for multiple tests of the same apparatus during a given shutdown period.

5.4.3 Approval is given by the Maintenance Coordinator or designee.

5.4.4 Existing systems testing during Restricted Access requires opening of the AGS or Booster LOTO Lock Box and the removal of LOTO for apparatus to be tested. The AGS or Booster LOTO Lock Box may be opened by the Maintenance Coordinator or designee after the appropriate approvals (three man rule) are obtained and recorded as per C-A OPM 2.14, Removal of Locks and Tags by Others.

5.5 The Maintenance Coordinator shall ensure that all temporary signs and barriers have been removed, and the test area has been returned to previous conditions.

6. Documentation

6.1 The Maintenance Coordinator maintains the filled out New Equipment Testing Checklist, C-A OPM-ATT 2.6.8.a for all new devices being testing in the AGS, Booster, or RHIC Rings.

6.2 The Main Control Room maintains the filled out "Ring Lockout-Tagout – System Testing Checklist", C-A OPM-ATT 2.6.8.b.

6.3 The System Testing Coordinator maintains the filled out "LOTO History for New/Existing Apparatus Testing", C-A OPM-ATT 2.6.8.c or 2.6.8.d.

7. References

7.1 C-A OPM 2.6, "Lockout/Tag for Personnel Entry into the AGS or Booster Ring"

7.2 C-A-OPM 2.6.1, "Lockout/Tagout for the AGS and Booster Rings During Accelerator Operations"

7.3 C-A-OPM 2.6.2, "Partial Lockout/Tagout for Apparatus Testing in the AGS and Booster Ring During Accelerator Operations"

7.4 C-A-OPM 2.6.4, "Procedure for Lockout/Tagout for the AGS and Booster Rings for Shutdown Periods"

7.5 C-A-OPM 2.14, "Removal of Locks and Tags by Others"

7.6 C-A OPM 4.1, "Procedure for Entry into Primary Radiation Areas Under Controlled Access Conditions"

8. Attachments

8.1 C-A-OPM-ATT 2.6.8.a, "New Equipment Testing Checklist"

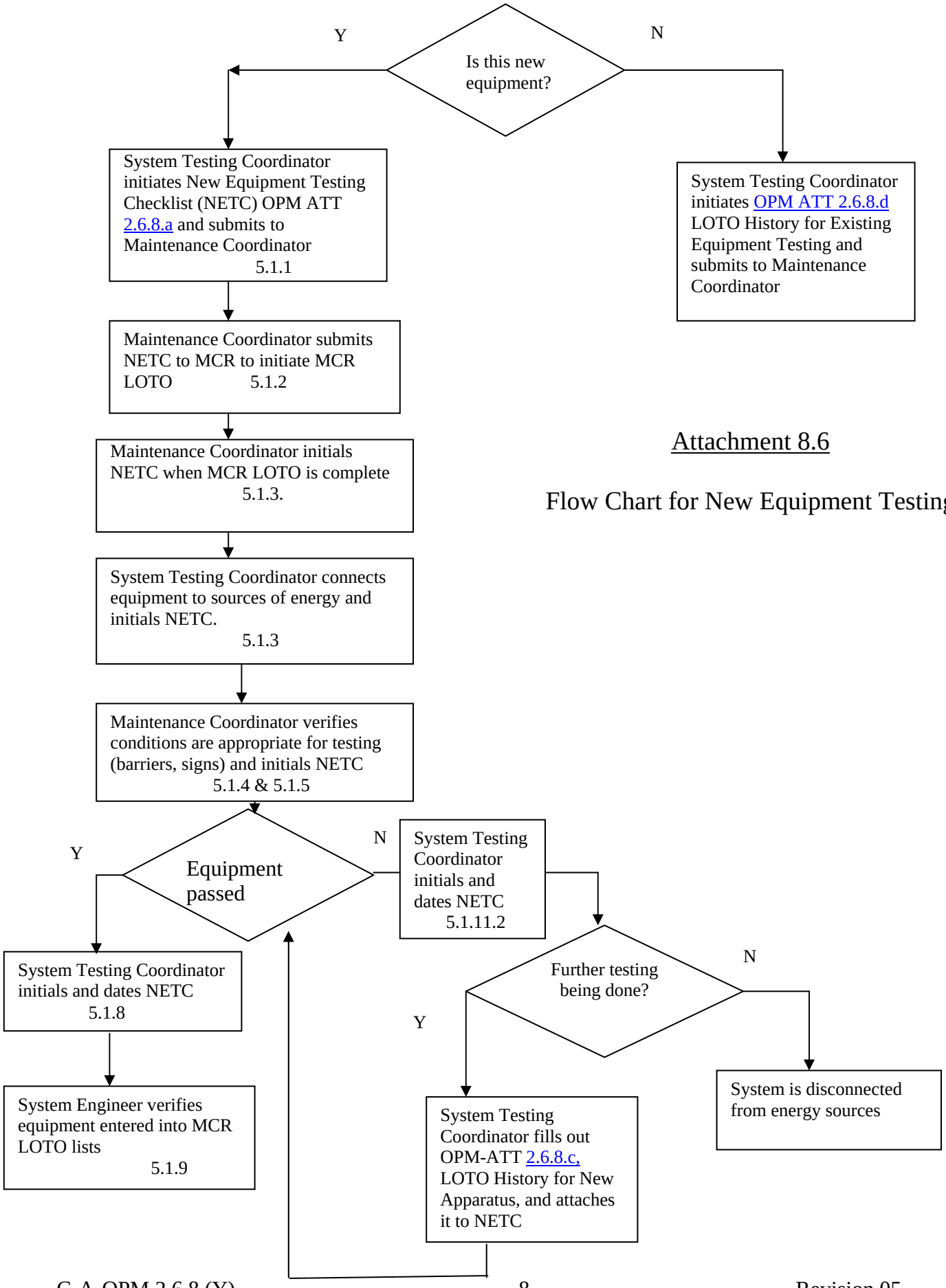
8.2 C-A-OPM-ATT 2.6.8.b, "Ring Lockout/Tagout Testing Checklist"

8.3 C-A-OPM-ATT 2.6.8.c, "LOTO History for New Apparatus Testing"

8.4 C-A-OPM-ATT 2.6.8.d, "LOTO History for Existing Apparatus Testing"

8.5 C-A-OPM-ATT-2.6.8.f, "Standard Testing Sign"

8.6 Flow Chart for New Equipment Testing.



Attachment 8.6

Flow Chart for New Equipment Testing