

ACCELERATOR DIVISION ES&H PROCEDURE

ADSP-10-0001

RADIATION AND ELECTRICAL SAFETY SYSTEM TESTING REQUIREMENTS

RESPONSIBLE DEPARTMENT Accelerator Division ES&H

PREPARED BY Randy M. Ziko DATE 5-16-13
AD ES&H Department Interlock Technician

REVIEWED BY [Signature] DATE 5-16-13
AD ES&H Department Head

REVIEWED BY [Signature] DATE 5/16/13
Fermilab ESH&Q Section Interlock Liaison

APPROVED BY [Signature] DATE 5-17-13
Accelerator Division Head

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1.0 PURPOSE AND SCOPE

1.1 The purpose of this procedure is to establish and define the Fermilab Accelerator Division implementation requirements concerning the initial and periodic testing of the Accelerator Division Radiation and Electrical Safety Systems (RSS and ESS).

1.2 The provisions of this procedure apply to the initial system testing of a new area and to the periodic system testing of existing areas. This procedure does not apply to tests done on individual components following installation, maintenance, or repairs.

2.0 DEFINITIONS

2.1 TEST DIRECTOR

The Test Director is the person designated by the AD ES&H Department Head to be in charge of a specific safety system test.

2.2 AREA

An area is a beam enclosure or enclosures protected by a specific radiation or electrical safety system.

2.3 SUBSYSTEM

A subsystem is a group of individual interlock components connected together to form an input to a specific radiation and/or electrical safety system.

2.4 SAFETY SYSTEM

A safety system is the subsystem elements needed as inputs which protect a specific area from radiation or electrical hazards.

3.0 RESPONSIBILITIES

3.1 AD ES&H DEPARTMENT INTERLOCK ENGINEER

The AD ES&H Department Interlock Engineer is responsible for:

- a. Preparing this procedure; and
- b. Ensuring that safety system test procedures are developed, reviewed, approved, and maintained in accordance with this procedure.

3.2 AD RADIATION SAFETY OFFICER

The AD Radiation Safety Officer is responsible for reviewing AD ES&H Departmental safety system test procedures in accordance with Section 4.2.

3.3 AD ES&H DEPARTMENT HEAD

The AD ES&H Department Head is responsible for:

- a. Appointing the ES&H Department Interlock Engineer;
- b. Approving AD safety system test procedures in advance of performing safety system tests;

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- c. Accepting AD safety system test records; and
- d. Approving the list of test directors.

3.4 ACCELERATOR DIVISION HEAD

In accordance with Chapter 10 of the Fermilab Radiological Control Manual, the AD Head is responsible for:

- a. Approving this procedure;
- b. Approving the list of personal authorized to perform maintenance, repairs and testing of AD Safety Systems.

4.0 INSTRUCTIONS

4.1 PREPARATION OF SAFETY SYSTEM TEST PROCEDURES

4.1.1 Safety system test procedures shall be written to thoroughly test the entire interlock system for each area in accordance with the requirements of the Fermilab Radiological Control Manual Chapter 10 (RSS) and Chapter 5044 of the Fermilab ESH Manual (ESS).

4.1.2 Safety system test procedures must include steps to positively inhibit beam from entering the area tested and inhibit power supplies from being energized during the test. The only exception to this will be the energizing of power supplies necessary to perform interlock tests called out in the test procedure.

4.1.3 Safety system test procedures shall be prepared as part of the ADDP-SH subseries procedures (AD ES&H Department Procedures) in accordance with ADAP-01-0001.

4.2 REVIEW AND APPROVAL OF SAFETY SYSTEM TEST PROCEDURES

4.2.1 Safety system test procedures shall be reviewed at a minimum by the AD Radiation Safety Officer and approved by the AD ES&H Department Head.

4.2.2 A documented review of all safety system test procedures covered by this procedure shall be conducted by the interlock engineer and the AD RSO at an interval not to exceed five years to ensure their continued validity.

4.2.3 A documented review for continued validity of safety system test procedures covered by this procedure shall be conducted by the interlock engineer and the AD RSO prior to use for areas where the interlock system has been modified.

4.2.4 Safety system test procedures shall be reviewed by the AD Radiation Safety Officer for the following content:

- a. Safety system test preparation procedures are sufficient to inhibit beam and prevent power supplies from being energized during the test;
- b. All interlocked enclosure access and search and secure keys are included in the test record;
- c. All non-interlocked enclosure access and search and secure keys are inventoried in the test record;
- d. All enclosure door interlocks are included in the test record;
- e. All radiation activated interlocks are included in the test record;
- f. Radiation activated interlock trip settings and testing limits in the test record are correct;
- g. All area critical devices are included in the test record; and
- h. All failure mode devices are included in the test record.

4.3 USE OF SAFETY SYSTEM TEST PROCEDURES AND RECORDS

4.3.1 Only approved test procedures shall be used to conduct safety system tests. A listing of the current approved revision of each test procedure is provided in AD ES&H Department Procedure Index, located on the AD ES&H server.

4.3.2 Only personnel approved by the AD Head may conduct safety system tests. A signed listing of the currently approved individuals authorized to conduct safety system tests is provided in Appendix A.

Note: An approved person may be accompanied by an unapproved person, who does not directly participate in the test, in order to satisfy beam line enclosure entry requirements.

4.3.3 Only personnel approved by the AD ES&H Department Head may serve as test director for safety system tests. A list of the currently approved individuals authorized to serve as test director for safety system tests is provided in Appendix A of ADDP-SP-2001.

4.3.4 The test record from the area test procedure is to be filled out according to the AD ES&H Department Procedure for testing the area. This test record is the documentation of the results of the safety system tests.

4.4 MODIFICATION OF SAFETY SYSTEM TEST PROCEDURES

4.4.1 In the event of non-standard situations which may arise during system testing, the test director may deviate from the approved test procedure as long as the intent of the procedure is being followed. The test director shall document the deviation in the test record, describe the reason for the change, initial, and date the deviation.

4.5 TEST ACCEPTANCE

4.5.1 The completed test record must be reviewed by the AD ES&H Department Head and his/her signature of acceptance of the test as satisfactorily demonstrating the operability of the area safety system must be documented on the test record. This fulfills the requirements of the Safety Envelope in the Safety Assessment Document for the Fermilab Accelerators and beam lines.

4.5.2 If the AD ES&H Department Head will not accept the test record, the test procedure or system must be changed and entire system or subsystem retested as defined by the AD ES&H Department Head.

4.6 REPORTING NON-CONFORMANCE DURING USE OF SAFETY SYSTEM TEST PROCEDURES

4.6.1 Tested items that fail during testing or which are found in an inoperable condition during the test will be replaced or repaired and fully retested prior to acceptance of the system. The failure or inoperable condition and the corrective action must be documented in the test record, initialed and dated by the test director. System testing will resume with the repaired component being retested within the subsystem.

4.6.2 Tested items that fail in an unsafe condition during testing or which are found in an inoperable and unsafe condition during the test, shall be reported to the AD ES&H Interlock Engineer by the test director. The AD ES&H Interlock Engineer shall inform the AD ES&H Department Head for possible reporting in accordance with Chapter 3010 of the Fermilab ESH Manual.

4.7 REPORTING OF TEST RESULTS

4.7.1 The completed test results shall be submitted by the Test Director to the AD ES&H Department Head for approval. After the AD ES&H department head has approved the test results he/she submits it to the AD RSO for documenting and forwarding to the Fermilab ESH&Q Section Interlock Liaison for record retention.

4.7.2 The Test Director shall file a summary of the test results in the Interlock Logbook. Summary information shall indicate a listing of the subsystems tested in the test procedure, the results of those tests, and any component failures or repairs necessary to complete the testing.

4.8 MAINTENANCE OF SAFETY SYSTEM TEST PROCEDURES

4.8.1 A controlled copy of the safety system test procedures is to be maintained in the AD ES&H Department Procedures Book.

5.0 EXTRA DIVISIONAL DISTRIBUTION

One controlled copy shall be provided to the Fermilab ESH&Q Section Interlock Liaison.

Appendix A

Personnel authorized to perform maintenance, repairs and testing
of AD safety systems.

Name	Fermi ID
John Anderson	4659
John Angelus	10388
Glenn Federwitz	3325
John Fomusa	2241
Greg Giese	3670
Mark Obrycki	5792
Gary Ross	2072
Chuck Worel	1943
Randy Zifko	4880

APPROVED BY


Accelerator Division Head

DATE

5-17-13