

Personnel Safety System Operator Training

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Course Goals

The goal of the safety systems operator training is to convey the knowledge required to operate the JLAB Personnel Safety Systems. For the purposes of organization of this document, the Course goals are divided in to separate functional modules. However, development of the actual training material may follow a different structure if it is determined that it enhances the effectiveness of the material.

Course Objectives

It is the objective of this set of course materials to familiarize the SSO candidate (SSOC) with the theory and operation of the CEBAF and FEL personnel safety systems to the point that they can follow PSS, AOD, and Operations department procedures to operate the PSS systems of the respective accelerator. At the completion of the course the SSO candidate should:

- Know PSS administrative procedures for personnel entry and exit from the accelerator enclosure.
- Recognize the lines of authority of the SSO and his/her duties as part of an operations crew.
- Know the requirements for safety system operation and the SSO position as outlined in the AOD, EH&S manual, and other relevant documents.
- Be able to configure the CEBAF and FEL PSS systems for accelerator operations without causing undue drops or down time to the respective program.
- Be able to carry out PSS access procedures without endangering personnel
- Be able to identify primary cause of PSS drops

Course Objectives (cont.)

- Be able to determine if an unknown or indeterminate state of the PSS or one of the devices controlled by the PSS represents immediate danger to personnel in or around the accelerator.
- Be able to identify conditions that may warrant operation of the emergency shutdown (crash) systems.
- Be able to respond to oxygen deficiency monitor alarms
- Be able to respond to PSS alarms

Introduction

This series of lectures is designed to introduce the operator to the Jefferson Lab Personnel Safety System (PSS). The material assumes the reader is at least somewhat familiar with the Jefferson Lab CEBAF and FEL accelerators and the equipment used to accelerate and transport the beam.

The class is divided into four parts:

- Introduction and System Description
- PSS Operation and Troubleshooting,
- Fast Electronic Systems
- Oxygen Deficiency Alarm Response

What is a Safety System?

A Safety System is an engineered system of interlocks, monitors, access controls, and warning devices used to prevent personnel injury that could arise from operation of the accelerators.

Safety System Operations

Operations of the Safety System Include:

- Directing the tunnel Sweep procedure
- Directing a tunnel Controlled Access
- Changing the state of the PSS
- Monitoring the status of the PSS
- Maintaining the Safety System log book
- ODH alarm response

SSO Duties

The Safety System Operator plays a crucial part in ensuring that personnel remain safe during accelerator operations.

The SSO has to know enough about the safety system to be able to:

- Know and follow procedures for operating the safety system
- Know how to configure the PSS for the various accelerator modes without dropping out the machine, causing lost beam time.
- Know enough about how the safety system works to be able to recognize abnormal or unsafe PSS status.
- Be able to diagnose the cause of a safety system fault or drop.

The main theme of this class will be dedicated to learning how the PSS operates.

Main SSO Responsibilities

- Ensure that personnel entering the tunnel do so safely.
- Ensure that the tunnel is properly swept and the sweepers are out of the tunnel before allowing hazardous equipment to operate.
- Understand the various PSS modes and how they affect safety of personnel.
- Keep records of personnel entering and exiting the enclosure, and changes in the state of the PSS.
- Ensure that the Crew Chief and on-duty staff is kept informed of the status of the PSS operations.

Main SSO Responsibilities (cont.)

- Make announcements for change of status of the beam enclosure.
- Report suspected malfunctions or inconsistencies in the PSS to the on duty crew chief.
- Act as first response personnel for an ODH alarm

Other SSO responsibilities will be given later in this presentation and are also given in the "Accelerator Operations Directives".

SSO Qualifications

To be qualified as an SSO one must complete the following steps:

- Complete this training – SAF141
- Achieve a score of 80% or better on a written Safety System Operator Test. A requalification test is given every 2 years.
- Demonstrate an ability to operate the safety system through a period of on the job training under the guidance of a qualified safety system operator.

There may be special restrictions or requirements for safety system operators who have not had full SSO training. For example, FEL safety system operators may only operate the safety system for the FEL. They may not operate the CEBA safety system. A table of safety system operator qualifications is kept in the PSS User's manual on the safety system console in the MCC.

References

Most of the material presented in this class can be found in one or more of the following references:

TN95-028 Description of the CEBAF Personnel Safety System
Personnel Safety System User's Handbook
TN95-034 CEBAF Beam Loss Accounting
CEBAF Personnel Safety System Configuration Control Policy
CEBAF Personnel Safety System Certification Procedures
Jefferson Lab Accelerator Operations Directives

A PSS on-call list is kept in the control room on-call book.

The Safety Systems Group web page can be found at "<http://www.jlab.org/accel/ssg/>"