

**Argonne National Laboratory  
Argonne Wakefield Accelerator (AWA)  
High Energy Physics Division**

**CONDUCT OF OPERATIONS**

**Approved:**

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## General Introduction

The Argonne Wakefield Accelerator at Argonne National Laboratory is an experimental accelerator facility designed primarily to facilitate studies of new acceleration techniques. It consists of a 20 MeV maximum energy RF photocathode based, high current electron linear accelerator and a separate, low current 4 MeV RF photocathode electron gun.

The equipment is used primarily by personnel in the High Energy Physics Accelerator R&D Group.

## Purpose

The purpose of this document is to provide information and/or instruction to ensure that AWA operations are conducted in an effective and consistent manner in accordance with appropriate AWA procedures and with applicable ANL and DOE requirements including environment, health, and safety.

## Scope

This document is issued to all AWA personnel and experimenters. AWA operating personnel are responsible for the operating performance and safe operation of the AWA. This document provides administrative instructions necessary for conduct of AWA operations.

### I. AWA Organization

- A. All AWA operations are controlled by the designated AWA Facility Manager. Safety requirements are line management responsibilities. The control of safety issues for the AWA is under the supervision of the HEPD Safety Committee. This Committee is responsible to the HEPD ES&H Administrator who, in turn, reports to the HEP Division Director.
- B. The Operating Report of the AWA provides information concerning the operating conditions of the AWA and of experiments performed.
- C. Qualified AWA Operators are accountable for their performances. Violations of approved operating practices can result in disciplinary action.

### II. Operating Practices

- A. The on-duty AWA Operator is responsible to the Facility Manager for safe operation of the AWA. Operations shall be in accord with AWA operating procedures for the facility and its sub-systems. The AWA Operator shall turn off any or all systems should he judge possible any unsafe situation.
- B. Safety practices for the AWA are found in the AWA Safety and Procedures Manual and in the ANL ES&H Manual.
- C. A record of AWA operations shall be kept in the AWA Facility Log whenever the AWA is operated. In addition to recording normal operating information, any unusual problems or other observations shall also be recorded in the log.
- D. All AWA personnel shall follow HEPD and building 366 ALARA goals.
- E. Only qualified AWA operators or operator trainees, under direct supervision of a qualified operator are authorized to operate the AWA controls.

### III. Activities

- A. The AWA Control Room activities shall be conducted in a manner that achieves safe and productive operation of the AWA facility.
- B. Access to the AWA vault shall be regulated by the operator in charge except during "open access".
- C. No non-qualified person shall be allowed entrance to potential AWA beam areas or other potentially hazardous areas unaccompanied by a qualified person. The AWA beam area is the area in which beam can enter or be produced solely by survey and secure of the area.

#### **IV. Communications**

AWA operators shall announce change of state of the AWA beam (e.g. on/off) in accordance with the Safety and Procedures Manual.

B. Abbreviations or terminology uncommon to the subject matter shall be avoided in verbal and written communications.

#### **V. Training**

A. Training shall employ written material and/or hands-on demonstration of proficiency. Certifiable training shall be required for AWA Operator/RF Systems Operator and Laser Systems Operator. Tests for certification shall be administered by the AWA Facility manager or his designated representative. A record of test results will be maintained. Certification will be repeated if modifications have been made to the relevant AWA systems which significantly alter procedures.

B. All AWA users will be certified in facility safety. The examination will be administered in the same manner as the certification exams described in Section V.A.

#### **VI. Investigation of Abnormal Events**

A. All unusual events shall be investigated by the responsible administrative persons.

B. All safety related events shall be investigated in accordance with the procedures defined in the HEPD Safety and Procedures Manual.

#### **VII. Notifications**

Notification shall be given to other organizations as appropriate and in accordance with ANL policies.

#### **VIII. Control of Equipment and Records of System Status**

A. AWA system status will be recorded in the current AWA Facility Log during experiments.

B. Records of equipment maintenance including dates performed and next scheduled maintenance shall be maintained in the AWA Facility Log.

C. Copies of drawings and circuit diagrams shall be maintained in the control room. Modifications and updates to these documents shall follow those described in the ANL ES&H Manual and in the HEPD Safety and Procedures Manual.

#### **IX. Lockouts/Tagouts**

Lockout/Tagout procedures shall follow those described in the ANL ES&H Manual and in the HEPD Safety and Procedures Manual.

**X. Independent Verification**

- A. Operation of the radiation safety interlock system shall be verified at six-month intervals by a representative of ES&H plus a qualified AWA operator. Keys, spare keys, and new locks for the interlock system must be ordered through the HEPD Administrator in a written request. (Ref. ANL Lockshop, Lock and Key Procedures (Jan 1992)).
- B. Operation of the laser safety interlock system shall be verified at six-month intervals by a representative of ES&H plus a qualified laser operator.

**XI. Logs**

The following logs shall be maintained for the AWA:

AWA Facility Log. Operating settings, parameters, appropriate narratives, and experimental conditions. Records of interlock bypass and safety related work permits. Appropriate equipment maintenance information (dates, action, scheduled maintenance, findings, etc.) Changers to facility and experimental configuration.

**XII. Required Reading**

AWA Safety and Procedures Manual

**XIII. Operating Procedures**

AWA operating procedures plus system specific procedures for the laser and RF systems shall be maintained in the AWA Safety and Procedures Manual. All procedures shall be reviewed and approved by the HEPD Safety Committee.

**XIV. Postings**

The following information shall be posted conspicuously in the AWA control room or vicinity:

- Emergency procedures
- Building maps
- Emergency shutdown procedures
- Identity and phone numbers of emergency personnel

**XV. Identifying labels**

Equipment such as piping, valves and switches shall be labeled following guidelines defined in the ANL ES&H Manual.

# **AWA Experimental Review Procedures**

## **Version 2**

September 22, 1999

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Leon T. Reed (HEPD Safety Officer)

## ***Introduction***

This document describes the procedure by which new experiments at the AWA are determined to be safe to perform. Also covered by this document are modifications to AWA accelerators or beamline configuration. The AWA SAD included an analysis of the main wakefield experiments (dielectric structures and plasmas) to be performed at the facility. Unlike most other accelerators at ANL, the AWA accelerator is itself an experimental device. The SAD was written to reflect the philosophy that all experiments were covered under the SAD and can be found in the AWA Safety and Operating Procedure Manual located in the AWA control room and in the office of the Division Safety Administrator. This document simply clarifies and formalizes procedures already in existence. All the experiments covered by this document fall within the AWA Safety Envelope as described in the SAD.

## ***Classification of Experiments/Facility Modifications***

(Hereafter, experiments/facility modifications will be referred to simply as experiments.)

1. No special approval is necessary for experiments that are clearly within the scope of experiments described in the SAD.
2. For experiments which are within the intent of the SAD but are not explicitly described, the Division Safety Officer (DSO) should provide documented advice and interpretation, such as with a Unreviewed Safety Issue (USI).
3. Experiments which are not clearly within the intent of the SAD should be referred to the review committee, with the approval authority being the Division Director (DD) or an individual to whom the DD has formally delegated that authority (typically the facility manager).

The group leader will perform determination of the classification of an experiment after consultation with other scientific and engineering staff members of the project. The vast majority of experiments will fall under category (1) and will require no special approval by the Division Safety Committee. Documentation of the experiment should be made in the operating logbook. Any experiment, which does not clearly conform to the safety envelope, should be treated as would a modification to the facility, and will be subject to a formal Unreviewed Safety Issue (USI) determination.

## ***Approval of New Experiments in Category 2***

Before the experiment is run, the group leader or his designate will send a brief memorandum to the Divisional Safety Officer describing the new experiment and its potential hazards. The Divisional Safety Officer (and at the DSO's discretion, members of the Division Safety Committee) will review the memorandum and inspect the new experiment. The DSO will then identify any deficiencies to be corrected and then send a memo of approval to the group leader and the Division Director once the deficiencies have been corrected. In addition, this information should be entered into the AWA facility logbook by the AWA Group Leader.

During the initial operation of the new experiment involving potential radiation levels outside the AWA vault, Health Physics will be notified in advance to send a technician to monitor levels in occupied areas. The results of this survey will be entered into the AWA logbook. It is not anticipated that any new experiment will produce unusual levels in occupied areas. If this should occur, administrative controls on machine rep rate, beam intensity, or area occupancy will be instituted to maintain acceptable maximum dose levels.

Category (3) involves major changes to the facility requiring a formal review and may require modifications to the Safety Envelope. The review committee will be convened by the DSO and will consist of at least some personnel from outside the HEP Division. The AWA Group Leader will send a memorandum to the DSO, copying the Division Director, describing the

changes in the facility and provide whatever other materials are required by the committee. The committee will send its findings to the HEP Division Director. The Division Director will approve operation of the experiment once any deficiencies are corrected by sending a memo to the AWA Group Leader with copies to the ALD and Division Safety Officer.

The attached flow chart illustrates the process that occurs for each experiment classified by the AWA Group Leader.

