

# ES&H Directives

## Overview

### ESHD 5008 ("Safety Manual") and other ESHDs

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#### SECTION 1

#### CONSTRUCTION SAFETY

This section addresses safety requirements for practices most commonly undertaken, including some of requirements of the U.S. Department of Energy (DOE), Occupational Safety and Health Act (OSHA), and PPPL. The provisions of this section apply during the construction, alteration, modifications, moving, or demolition of any building or structures, systems and components at PPPL, and are applicable to both Laboratory personnel and outside subcontractors.

Requirements include Standards, Special Hazards Briefings, Inspections, Personal Protective Equipment, Access, Subcontractor Training Requirements, and Construction Tools and Equipment.

Other topics discussed include: Ladders, Scaffolds, Ramps and Runways, Floor Openings, Hatchways, Air Tools, Electrical, Illumination, Housekeeping, Compressed Gas Cylinders, Temporary Heating, Fire Protection, Excavating and Trenching, Excavating Equipment, Motor Vehicles, Mobile Cranes, Signs and Barriers, Explosives, Emergency Medical Treatment, Control for Hazardous Waste/materials, and Other Requirements of OSHA.

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#### SECTION 2.0

#### ELECTRICAL SAFETY

This Section 2.0 covers regulations, practices, and procedures set forth by PPPL to control and minimize the hazards associated with electrical systems and equipment. The Section applies to all personnel directly engaged in work processes performed on electrical systems and equipment at the Laboratory during the life cycle of its facilities and projects. The section covers: administrative responsibilities, general safety practices, and procedures, methods and recommended practices to mitigate hazards associated with specific types of electrical equipment and to satisfy requirements. Other topics include: Isolation of Hazards, Personnel-Safety-Interlock Systems, Capacitors and Capacitor Banks, Electrical Conductors and Connectors, Enclosures for Electrical Equipment, Inductors and Electromagnets, Instrumentation and Control Systems, Power Supplies, Resistors, Specialty Switches, Battery Banks, Live-Line Tools & Temporary Grounding Devices, and Reference documents, Acceptable Isolation Techniques, Permit for Climbing or Walking On Cable Trays, Capacitor Bank Inspection Form, information on Electrical Arc Burns, Pressures Developed by AC Electric Arcs, Sample calculations of flash protection boundary, and Sample calculations of enclosed ac arc overpressures.

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**Section 3.0**

**LASER SAFETY**

This section on laser safety is intended to provide specific requirements and guidelines based on ANSI Z136.1 to ensure the safety of laser operators and other individuals likely to be exposed to laser hazards. Hazard classification of lasers, appropriate Controls, Laser Personal Protective Equipment, Training, and Medical Surveillance requirements are included. Also included is an Outline for Laser Safe Operating Procedures, information on Laser Pointers, Control Measures for the Four Laser Classes, and Laser - Danger and Caution Signs.

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**Section 4.0**

**RF MICROWAVE & MAGNETIC SAFETY**

It is the purpose of this section to provide safety guidelines to minimize the potential hazards to health that radio frequency, microwave, and static-magnetic field generating equipment present to PPPL employees and visitors. It is not intended to include infrared, visible, ultraviolet, ionizing radiation or ac to 2999 Hz.

The section includes RESPONSIBILITIES, REQUIREMENTS, Hazards, RF & Microwave Equipment Electrical Safety, and Construction Practices, Operating Criteria, Maximum Permissible Exposure (MPE), Exclusions, Measurements, Relaxation of Power Density Limits for Partial Body Exposures, Controls, Design and Construction Criteria, Magnetic Field Safety, Static Magnetic Field Limits, and Safety Restrictions For Pacemaker Wearers.

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**Section 5.0**

**FIRE PROTECTION**

Areas covered in this Section include: Fire Protection Program Overview, Fire Protection, Environmental and Public Protection, Appraisal Program, Fire Department Operations and Emergency Response, Automatic Fire Protection Systems, PPPL Occupancy Classifications, Fire Protection Exemptions, and Equivalencies, and Fire Protection Systems Inspections, Testing, & Maintenance Frequencies.

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**Section 6.0**

***RESERVED***

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**Section 7.0**

**WASTE MANAGEMENT**

The provisions of this section apply to all classification, handling, transportation, and packaging of hazardous wastes at PPPL, and are applicable to both Laboratory personnel and outside subcontractors. The hazards associated with hazardous wastes are discussed along with the precautions necessary to avoid injury or property loss. The Section includes discussion on Responsibilities, Satellite Accumulation of Wastes, Hazardous Waste Identification Tags, Waste Generator Responsibilities, Radioactive Waste Handling Facility, Radioactive Material Identification Sheets, Stored Radioactive Material, Waste Processing, and Life-Cycle Planning for Waste Generation and Disposal Options.

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**Section 8.0**

**INDUSTRIAL HYGIENE**

This Section covers numerous industrial hygiene related hazards and controls at PPPL and applies to all Laboratory personnel and contractors. Topics include: Chemicals, Carcinogens, Ventilation, Confined Spaces, Personal Protective Equipment, Filter Lenses for welding and laser use, Respiratory Protection, Noise Control and Hearing Conservation, Housekeeping and Sanitation, Training, Thermal Stress, Hazard Communication including Location of Right-To-Know Information Stations, How to use a Material Safety Data Sheet (MSDS), Basic Hazard Communication Training Outline, and ES&H Review of Procurements.

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**Section 9.0**

**OCCUPATIONAL SAFETY**

This Section provides requirements and guidelines for the many facets of the Occupational Safety program. Specific Chapters are devoted to: Compressed Gas Cylinder Safety; Cryogenic Safety; Lifting, Portable Ladders, Platforms, and Scaffolds; Machine Guarding; Machine Tools; Forklifts, Work Platforms, and Special Purpose Vehicular Requirements; Office Safety; Accident Investigations; Pressure Systems; Safe Use of Tools; Working Alone; Vacuum Windows; and Welding, Cutting, and Brazing.

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**Section 10.0**

**RADIATION SAFETY**

The provisions of this section apply to all PPPL activities that manage radiation and radioactive materials that may potentially result in radiation exposure to workers, the public and the environment. Information on the following topics is included: Radiation Protection Programs, PPPL ALARA Program, Exposure Limits, Area Monitoring, Worker Monitoring, Receipt of Packages Containing Radioactive Material, Radiation Areas, Posting and Labeling, Controlled Areas, Records, Reporting, Radiation Safety Training, Design and Control, Release of Materials and Equipment from Radiological Areas, Accidents and Emergencies, Control Of Sources of Radiation, and Shielding.

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**Section 11.0**

**OPERATIONS HAZARD CRITERIA AND SAFETY CERTIFICATION**

**Chapter 1 - Operations Hazard Criteria**

This Chapter provides classifications for operations according to their hazard level, indicates the required control actions to be performed for each hazard level, and specifies the approval level required. All operations at PPPL are classified as either LOW, MODERATE, OR HIGH safety hazards. Hazard Analysis, Safety Training, On-The-Job-Training, Pre-Job Briefings, Safety Assessment Documents, Safety Analysis Reports, and Safety Certification are all discussed.

**Chapter 2 - Safety Certification System**

This chapter discusses the PPPL requirements, issues, reviews, and control of Safety Certificates for on-site activities. The Safety Certification System provides a formalized, standardized means of assuring independent review and authorization of High Hazard operations. Reviews and authorizations conducted under this chapter are in addition to NEPA reviews and certifications required by procedure ESH-014. Safety Certificates are required for all operations that have been designated by the Responsible Line Manager to be High Hazard. The ES&H Executive Board (ES&H/EB) issue certificates. For High Hazard operations, the ES&H/EB appoints an Activity Certification Committee (ACC) to review the proposed operation. The Safety Certificate constitutes PPPL approval to conduct the High Hazard operation within the constraints indicated therein.

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**Section 12.0**

**ENVIRONMENTAL PROTECTION**

This Section provides the basis for PPPL's Environmental Protection Program and refers the reader to the appropriate documents for further details about a particular element of the Program. Included in this Section are references to Laws and Regulations, PPPL implementing documents, and required reports.

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