**The Pennsylvania State University**

**Safety Risk Assessment for Lab Electrical Equipment**

**Introduction:**

Electricity is a serious workplace hazard, capable of causing both employee injury and property damage. It is the policy of the Pennsylvania State University (PSU) to protect all employees, students, and other personnel from potential electrical hazards. This will be accomplished through compliance with the work practices described herein along with effective application of engineering controls, administrative controls, and the use of personal protective equipment.

The PSU electrical safety program is founded on the principle of avoiding energized work unless it is absolutely necessary. Live parts will be deenergized in accordance with the PSU Lockout/Tagout Program before an employee works on or near them unless one of the following conditions applies:

* **Deenergizing introduces additional hazards or increased risk.** Examples of “additional hazards or increased risk” would include interruption of life support equipment, deactivation of emergency alarm systems, or shutdown of hazardous location ventilation systems.
* **Deenergizing is not possible due to equipment design or operational limitations.** Examples of this situation would include diagnostic work such as voltage measurements, troubleshooting, and testing of electrical equipment.
* **Live parts are operating at less than 50 volts and there is no increased exposure to electrical burns or to explosion due to electrical arcs.**

**Purpose:**

This program has been established in order to:

* Ensure the safety of employees who may work on or near electrical systems.
* Ensure that work units understand and comply with safety standards related to electrical work.
* Ensure that work units follow uniform practices during the completion of electrical work.

**Scope & Applicability:**

This program contains requirements pertaining to any electrical task/work conducted by laboratory/research personnel in any laboratory/research area for the purposes of conducting research/experiments/course work.

This program applies to all Penn State properties and work performed by Penn State employees regardless of job site location. The Hershey Medical Center and the College of Medicine are exempt from this program.

1.0 **References:**

The following documents were used as references when developing this program:

* Pennsylvania State University Energized Electrical Safety Program
* Pennsylvania State University Laboratory & Research Safety Plan - SY43

1. **Training For Person Conducting the Risk Assessment:**

The person conducting the risk assessment (appendix A) must be qualified. A qualified person is trained and knowledgeable in all of the following topics: *A person can be considered qualified with respect to certain equipment and methods but unqualified for other pieces of equipment and methods*.

1.) Construction and operation of equipment on which work is assigned.

2.) Skills and techniques necessary to distinguish exposed energized parts from other parts of electrical equipment.

3.) Skills and techniques necessary to determine the nominal voltage of exposed live parts.

* *An individual can obtain knowledge in the three topics listed above through a combination of methods including the individual’s education, electric license, past work experience, and on-the-job training.*

4.) The approach distances specified in this document and the corresponding voltages to which the qualified employee will be exposed.

5.) The process necessary to determine the degree and extent of electrical hazards along with the PPE and job planning necessary to perform the task safely.

6.) Methods of safe release of victims from contact with exposed energized electrical conductors or circuit parts.

* *An individual must attend an NFPA 70E training session approved by EHS to obtain the required knowledge of the three topics listed above.*

1. **Requirements and Responsibilities:**
   1. The lab Principal Investigator (PI) is responsible for:
2. Ensuring that a risk assessment (See Appendix A) and an equipment usage SOP are created and documented as required and defined in the Laboratory and Research Safety Plan- Policy SY43.

* The risk assessment can be a separate document from the SOP or both documents can be merged into one. This allows for flexibility in developing the documents.
* If the PI is not familiar enough/qualified with the equipment/task/research to complete the risk assessment and SOP, they must designate other employee/s such as lab supervisor/lab manager/research assistant to become the qualified person.
* College/work unit Safety Officers/Department Safety Officers/EHS are available to offer guidance regarding the completion of the risk assessment portion.

1. Ensuring that employees are trained by the qualified person and that the training is documented. Training includes a review of the risk assessment, SOP, equipment & PPE.
2. Ensuring that controls (safe work practices, guarding, etc) are put in place and utilized according to the risk assessment and SOP.
   1. Safe work practices and training:

These are general requirements that apply to electrical tasks.

* + 1. No live electrical work 50 volts or higher is permitted except for voltage testing and troubleshooting. Appropriate PPE must be worn during these tasks.
    2. Lockout/Tagout procedures must be utilized when performing servicing/maintenance on electrical equipment hard wired to electrical disconnects.

-Lockout/Tagout training is required for employees who perform these activities.

* + 1. Cord and plug powered equipment must be unplugged before performing servicing/maintenance activities to ensure that there is no risk of electrical shock.
    2. Training must take place before circuit breakers/disconnects can be operated. There are specific safe work practices that must be followed for this task.
    3. Determine safe path to exit the room (must be kept clear) and communicate this information to occupants.
  1. Special restrictions pertaining to lab - PI’s, supervisors, managers, research assistants, graduate assistants and undergraduate students where interaction of building electrical components is required.
     1. University Policy AD38 – “Administration of University Physical Facilities” must be adhered to. The policy establishes the responsibility for the administration of the University physical facilities, including buildings, infrastructure, and grounds at all University locations.

-Refer to PSU Policy AD38.

* + 1. Common tasks that would require interaction with building infrastructure include but aren’t limited to:
    2. Operating (opening/closing) a circuit breaker/disconnect switch that is affixed to a Penn State University owned/operated building.

-This task is permitted by PI’s, supervisors, managers, research assistants, graduate assistants if they have received training to safely do so.

-EHS has an online training program regarding this.

* + 1. Installing/removing breakers/fuses in electrical panels affixed to a Penn State University owned/operated building:

-PSU electrician or other qualified Technical Service employees must perform this work.

* + 1. Making final wiring connections to/from an electrical breaker panel/disconnect box that is affixed to a Penn State University owned/operated building for the intentions of installing/un-installing equipment.

-PSU electrician or qualified Technical Service employee is required to perform this work.

* As noted in University Policy AD38, exemptions to section 4(b)(iii) can be requested through formal memoranda of understanding process. This process is initiated through OPP Buildings & Grounds. Contact OPP – Director of Buildings and Grounds or Facilities Management.