



**SAN JOSÉ STATE  
UNIVERSITY**

Electrical Safety and Energy Control Program

San Jose' State University  
One Washington Square  
San Jose', California

Facilities Development and Operations Department  
Environmental Health and Safety

September 2, 2011

---



**Page intentionally left blank.**

## Electrical Safety and Energy Control Program Administration

### 1) Purpose and Scope

The purpose of the San Jose' State University (SJSU) Electrical Safety and Energy Control Program is to establish minimum training requirements and safe operating practices for employees and contractors. The program establishes management hierarchy and responsibility and engineering controls and procedures for work on campus buildings and electrical utility systems and equipment maintenance and servicing operations. It also establishes minimum work planning requirements and electrical safety procedures for the university.

The Electrical Safety and Energy Control Program was developed under the direction of the Associate Vice President of Facilities Development and Operations, the Director of Utilities Maintenance and Operations, and the Director of Environmental Health and Safety of San Jose' State University.

### 2) Standards, Regulations and References

- a) National Fire Protection Association (NFPA) Standard 70E. Electrical Safety in the Workplace.
- b) California Code of Regulations (CCR), Title 8, Subchapter 7. General Industry Safety Orders. Section 3203. Injury and Illness Prevention Program.
- c) CCR, Title 8, Subchapter 7. General Industry Safety Orders. Section 3314. The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, Including Lockout/Tagout.
- d) CCR, Title 8, Subchapter 5. Electrical Safety Orders.  
Group 1. Low Voltage Electrical Safety Orders.  
Section 2320.1. General  
Section 2320.2. Energized Equipment or Systems  
Section 2320.4. De-energized Equipment or Systems.  
Section 2320.5. Energizing (or Re-energizing) Equipment or Systems.  
Section 2320.6. Accident Prevention Tags.
- e) Group 2. High Voltage Electrical Safety Orders  
Section 2700. Definitions  
Section 2706. Application
- f) Group 2. High Voltage Electrical Safety Orders  
Article 36. Work Procedures and Operating Procedures.  
Section 2940. General Provisions.  
Section 2940.6. Tools and Protective Equipment.  
Section 2945. Access and Workspace Requirements - Appendix C

### 3) Roles and Responsibilities

#### a) The University

The University is committed to and has a duty to provide a safe and healthful work environment for employees and contractors from the occupational exposure to electrical and uncontrolled energy sources.

### **b) Environmental Health and Safety Section**

Environmental Health and Safety will ...

- i) Establish, implement and maintain the Electrical Safety and Energy Control Program that is designed to eliminate or minimize employee exposure to electrical and uncontrolled energy sources.
- ii) Perform an employee exposure assessment to identify the employees who are at risk with the collaboration of each department's management and document the findings.
- iii) Develop and implement campus-wide training requirements and materials. Employee information and training are provided at the time of initial assignment and every three years thereafter.
- iv) Develop and implement a process to perform an annual periodic inspection of the energy control procedures in order to evaluate their effectiveness and to determine the necessity for updating the written procedures.
- v) Maintain a record of training given to employees. Records will be maintained until the completion of the next annual retraining.
- vi) Maintain a record of those employees who are qualified electrical workers and employees who are authorized to perform lockout.
- vii) Maintain a record of completed Energized Electrical Work Permits for one year.
- viii) Review and update the Electrical Safety and Energy Control Program annually.

### **c) Department Management**

Each affected Department will ...

- i) Collaborate with the Environmental Health and Safety Section in the employee exposure assessment process to identify employees potentially exposed to electrical hazards and uncontrolled energy sources. It is the department management's responsibility to determine the competency of qualified workers based on the level of risk and worker's level of training.
- ii) Enable employees who are qualified electrical workers and who are authorized to perform lockout to receive electrical safety and energy control training on paid working hours.
- iii) Develop and enforce work practices and methods designed to control or eliminate the risk of exposure to electrical and uncontrolled energy hazards.
- iv) Provide the necessary work implements, such as locks, tags, tools, gloves, and personal protective equipment to employees that will enable employees to perform their work safely.
- v) Issue Energized Electrical Work Permits for work on circuits and equipment with energized parts.
- vi) Coordinate with Contractors that perform work onsite to ensure that they are provided SJSU lockout procedures and that they have an opportunity to apply their locks and tags to energy isolation disconnects and devices.

**d) Employees**

Every employee who is at risk of exposure to electrical and uncontrolled energy hazards will ...

- i) Receive electrical hazard awareness training and energy control training on paid working hours.
- ii) Be provided with the necessary work implements, such as locks, tags, tools, gloves, and personal protective equipment, and to use them to perform their job safely.
- iii) Follow the prescribed work practices and methods designed to control or eliminate the risk of exposure to electrical and uncontrolled energy sources.
- iv) Report unsafe conditions and work practices that are beyond their work skills to their supervisor.

**4) Contractor Services**

Contractors will coordinate with appropriate SJSU department management to ensure that the contractor is provided with SJSU lockout procedures and be given the opportunity to apply their locks and tags for the equipment and processes that they will service.

**5) Program Audit**

Environmental Health and Safety will perform a program audit annually and make improvements to the San Jose' State University Electrical Safety and Energy Control Program as conditions change.

**6) Document History and Control**

The San Jose' State University Electrical Safety and Energy Control Program described herein supersedes all prior written Electrical Safety and Energy Control Program documents.

<i>Rev #</i>	<i>Document Revision History</i>	<i>Author</i>	<i>Reviewer</i>	<i>Date</i>
00	Revision No Change Initial Document	David Krack, Director Environmental Health and Safety	Adam Bayer, Director Utilities Maintenance & Operations Kym Bersuch, SETC Safety Representative	September 2, 2011
01				



**Page intentionally left blank.**

# **The Electrical Safety and Energy Control Program**



**Page intentionally left blank.**



## The Electrical Safety and Energy Control Program

The University is committed to and has a duty to provide a safe and healthful work environment for all employees and contractors from the occupational exposure to electricity and uncontrolled energy sources.

**1) The Electrical Safety and Energy Control Program is designed to eliminate or minimize occupational exposure to electrical and uncontrolled energy sources.**

The Electrical Safety and Energy Control Program includes the following key elements:

- a) Determination of employee exposure
- b) Implementation of various methods of exposure control, including:
  - i) Qualified Persons
  - ii) Lockout Procedures and High Voltage Switching Orders
  - iii) Electric Arc Flash Personal Protective Equipment
- c) Communication of hazards to employees and training
- d) Recordkeeping

**2) Definitions**

- a) "Affected employee" means an employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting-up or adjusting operations are being performed under lockout, or whose job requires the employee to work in an area in which such activities are being performed under lockout.<sup>1</sup>
- b) "Authorized employee" means a qualified person who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties including performing cleaning, repairing, servicing, setting-up and adjusting operations.<sup>2</sup>
- c) "Locked out" means the use of devices, positive methods and procedures, which will result in the effective isolation of machinery and equipment from mechanical, hydraulic, pneumatic, chemical, electrical, thermal or other hazardous energy sources.
- d) "Lockout" is the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- e) "Lockout device" is a device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

---

<sup>1</sup> CCR T8 §3314. (b) Definitions. The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, Including Lockout/Tagout.

<sup>2</sup> CCR T8 §3314. (b) Definitions.

- f) “De-energized” means free from any electrical connection to a source of potential difference and from electrical charge; not having a potential different from that of the earth.
- g) “Disconnecting Means” is a device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.
- h) “Energized” means electrically connected to a source of potential difference.
- i) “Energy isolating device” is a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.
- j) “Exposed electrical parts” means capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated, or insulated.
- k) “Ground” means a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of the earth.
- l) “Locking in the Open Position” means the use of lockable devices, such as padlocks, combination locks or other positive methods or procedures which will effectively prevent unexpected or inadvertent energizing of a designated circuit, equipment or appliance.
- m) "Personal Protective Equipment" is specialized clothing or equipment worn or used by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard is not considered to be personal protective equipment.
- n) “Qualified Person” is a person, designated by the employer, who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved.<sup>3</sup>

#### NOTES:

1. Whether an employee is considered to be a "qualified person" will depend upon various circumstances in the workplace. For example, it is possible for an individual to be considered "qualified" with regard to certain equipment in the workplace, but "unqualified" as to other equipment.

2. An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person is considered to be a qualified person for the performance of those duties.

---

<sup>3</sup> CCR T8 Subchapter 5. Electrical Safety Orders. Group 1. Low-Voltage Electrical Safety Orders. Article 1. Definitions. §2300. Scope. (b) Definitions.

- o) “Qualified Electrical Worker” is a qualified person who by reason of a minimum of two years of training and experience with high-voltage circuits and equipment and who has demonstrated by performance familiarity with the work to be performed and the hazards involved.<sup>4</sup>
- p) “Tagout” is the placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
- q) “Tagout device” is a prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
- r) “High Voltage System” relates to associated electrical conductors and equipment operating at or intended to operate at a sustained voltage of more than 600 volts between conductors.
- s) “Low Voltage System” relates to associated electrical conductors and equipment operating at or intended to operate at a sustained voltage of 600 volts or less between conductors.

### 3) Exposure Determinations

An exposure determination was made of university staff positions by the Environmental Health and Safety Section. It was determined that the following classes of employees have an occupational exposure to electrical and uncontrolled energy sources and are enrolled in the SJSU Electrical Safety and Energy Control Program. The nature of exposure risk detail is listed in Appendix A.

#### Exposure Determinations

#	Department Building Location	Job Title of Employees at Risk of Exposure	Nature of Exposure Risk	Approximate Number of Employees at Risk
1	Facilities Development and Operations Department Central Plant	<b>Qualified Electrical Workers</b>  Power distribution trades.	High voltage electrical work.	
2	Facilities Development and Operations Department Campus Wide	<b>Lockout Authorized Employees</b>  Electrical Trades HVAC Trades Energy Management Plumbing Trades SETC Project Supervisors	Low voltage electrical work.  Service and repair of mechanical equipment and machinery.  Service and repair of HVAC equipment.  Service and repair of pumps.	

<sup>4</sup> CCR T8 Subchapter 5. Electrical Safety Orders. Group 2. High-Voltage Electrical Safety Orders. Article 1. Definitions §2700. Definitions.

#	<i>Department Building Location</i>	<i>Job Title of Employees at Risk of Exposure</i>	<i>Nature of Exposure Risk</i>	<i>Approximate Number of Employees at Risk</i>
3	Student Housing Department	<b>Lockout Authorized Employees</b> Electrical Trades HVAC Trades Plumbing Trades SETC Project Supervisors	Low voltage electrical work. Service and repair of equipment and machinery. Service and repair of HVAC equipment. Service and repair of pumps.	
4	University Computer Center	<b>Lockout Authorized Employees</b>	Low voltage electrical work. Service or repair of UPS (Uninterruptable Power Systems)	
5	College of Engineering Jan Botha 4-3953 Professor Civil & Environ Engineering ENG 161 - 0083 Jan.Botha@sjsu.edu	<b>Lockout Authorized Employees</b>	Low voltage electrical work.	

## 4) Methods of Implementation and Control

### a) Only Qualified Workers shall work on energized low voltage electrical equipment or systems.<sup>5</sup>

- i) Work shall not be performed on exposed energized parts of equipment or systems until the following conditions are met:
  - (1) Responsible supervision has determined that the work is to be performed while the equipment or systems are energized.
  - (2) Involved personnel have received instructions on the work techniques and hazards involved in working on energized equipment.
  - (3) Suitable personal protective equipment and safeguards (i.e., approved insulated gloves or insulated tools) are provided and used.  
  
Exception: The use of approved insulating gloves or insulated tools or other protective measures are not required when working on exposed parts of equipment or systems energized at less than 50 volts provided a conclusive determination has been made prior to the start of work by a qualified person that there will be no employee exposure to electrical shock, electrical burns, explosion or hazards due to electric arcs.
  - (4) Approved insulated gloves shall be worn for voltages in excess of 250 volts to ground.
  - (5) Suitable barriers or approved insulating material shall be provided and used to prevent accidental contact with energized parts.
  - (6) Suitable eye protection has been provided and is used.
  - (7) Where required for personnel protection, suitable barricades, tags, or signs are in place.
  - (8) Each employee who is exposed to the hazards of flames or electric arcs wears apparel that, when exposed to flames or electric arcs, does not increase the extent of injury that would be sustained by the employee. Clothing made from acetate, nylon, polyester, and rayon, either alone or in blends, is prohibited unless it can be demonstrated that the fabric has been treated with flame retardant.
  - (9) The appropriate administrator shall issue an Energized Electrical Work Permit and ensure that all conditions are met.
- ii) All electrical equipment and systems shall be treated as energized until tested or otherwise proven to be de – energized.
- iii) Qualified Workers are listed in Appendix B

### b) Only Qualified Electrical Workers shall work on energized conductors or equipment connected to energized high-voltage systems.<sup>6</sup>

- i) No employee shall be assigned to work alone except for replacing fuses, operating switches or other operations that do not require the employee to contact energized high-voltage conductors or energized parts of equipment, clearing "trouble" or in emergencies involving hazard to life or property.

<sup>5</sup> CCR T8 Subchapter 5. Electrical Safety Orders. Group 1. Low-Voltage Electrical Safety Orders. Article 3. Work Procedures. §2320.2. Energized Equipment or Systems.

<sup>6</sup> CCR T8 Subchapter 5. Electrical Safety Orders. Group 2. High-Voltage Electrical Safety Orders. §2940. General Provisions.

- ii) Employees in training, who are qualified by experience and training, are permitted to work on energized conductors or equipment connected to high-voltage systems while under the supervision or instruction of a Qualified Electrical Worker.
  - iii) Observers. During the time work is being done on any exposed conductors or exposed parts of equipment connected to high-voltage systems, a Qualified Electrical Worker, or an employee in training, shall be in close proximity at each work location to:
    - (1) Act primarily as an observer for the purpose of preventing an accident, and
    - (2) Render immediate assistance in the event of an accident.
  - iv) Qualified Electrical Workers are listed in Appendix B
- c) De – energized Equipment or Systems: Lockout Procedures<sup>7</sup>**
- i) Employees who are authorized and who have de-energized equipment or systems will lockout said equipment or systems unless the equipment is physically removed from the wiring system.
    - (1) Employees shall be issued a lockout device that is to be used exclusively for personal safety. The lockout device shall be placed on the equipment or group lockbox while the employee is working on the equipment. The lockout device represents their physical presence on the job.
    - (2) Lockout devices shall be singularly identified and uniquely keyed; shall be the only devices used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:
      - (a) Durable,
      - (b) Standardized within the facility by color and shape,
      - (c) Substantial, and
      - (d) Identifiable with the identity of the employee applying the devices.
  - ii) The following steps will be taken before working.
    - (1) Notifying all affected and involved personnel.
    - (2) Locking the disconnecting means in the "open" position with the use of lockable devices, such as padlocks, combination locks or disconnecting of the conductor(s) or other positive methods which will effectively prevent unexpected or inadvertent energizing of a designated circuit, equipment or appliance. A sufficient number of lockable devices, one for each energy isolating device, will be taken from the central tool and supply room for such purpose.

Exception: Locking is not required if an energy isolating device is not capable of being locked out. A tagout device shall be used in its place. When a tagout device is used, the tagout device shall be attached at the same location that the lockout device would have been attached.

---

<sup>7</sup> CCR T8 Subchapter 5. Electrical Safety Orders. Group 1. Low-Voltage Electrical Safety Orders. Article 3. Work Procedures §2320.4. De-Energized Equipment or Systems.

- (3) Tagging the disconnecting means with accident prevention tags provided with the following minimum information:
  - (a) Reason for placing tag.
  - (b) Name of person placing the tag and how that person may be contacted.
  - (c) Date tag was placed.
- (4) Effectively blocking the operation or dissipating the energy of all stored energy devices which present a hazard, such as capacitors or pneumatic, spring-loaded and like mechanisms.

iii) Lockout Authorized Employees are listed in Appendix B

**d) Energizing or Re-Energizing Equipment or Systems.<sup>8</sup>**

An authorized person will perform the following procedural steps before energizing equipment or systems which have been de-energized:

- (1) Determining that all persons are clear from hazards which might result from the equipment or systems being energized.
- (2) Removing locking devices and tags.
  - (a) Locking devices and tags may be removed only by the employee who placed them. Locking devices and tags shall be removed upon completion of the work and after the installation of the protective guards and/or safety interlock systems.

Completion of the work means the end of the shift or when the employee stops working and is no longer present on the job site.

Locking devices taken from the central tool and supply room for each energy isolating device will be returned.
  - (b) If the employee has left the premises or is otherwise unavailable and their lock and tag was not removed, other persons may be authorized by the appropriate administrator to remove the locking devices and tags in accordance with the procedure described below.
    - (i) Verification by the appropriate administrator that the authorized employee is not at the facility;
    - (ii) Making all reasonable efforts to contact the employee to inform him/her that his/her lockout device has been removed; and
    - (iii) Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

---

<sup>8</sup> CCR T8 Subchapter 5. Electrical Safety Orders. Group 1. Low-Voltage Electrical Safety Orders. §2320.5. Energizing (or Re-Energizing) Equipment or Systems.

**e) Hazardous Energy Control Procedures for Machinery and Equipment.<sup>9</sup>**

- i) A hazardous energy control procedure shall be developed by the affected department management and utilized before work is initiated on the cleaning, repairing, servicing, and setting up or adjusting machinery and equipment.
  - (1) The hazardous energy control procedures shall be documented in writing.
  - (2) The hazardous energy control procedure shall include separate procedural steps for the safe lockout of each machine or piece of equipment affected by the procedure.
  - (3) The procedural steps for the safe lockout of machinery or equipment may be used for a group or type of machinery or equipment, when:
    - (a) The operational controls named in the procedural steps are configured in a similar manner, and
    - (b) The locations of disconnect points (energy isolating devices) are identified, and
    - (c) The sequence of steps to safely lockout the machinery or equipment is similar.
- ii) Hazardous energy control procedures are developed for high voltage switching by a Qualified Electrical Worker in the Central Plant and Utility Distribution facility and documented in the Redtag™ Instamation Systems database software.
- iii) Hazardous energy control procedures are developed for machinery and equipment located in the Central Plant and Utility Distribution facility by an authorized lockout employee and documented in the Redtag™ Instamation Systems database software.
- iv) Hazardous energy control procedures are developed for machinery and equipment located throughout the university by an authorized lockout employee in the Utilities Maintenance and Operations facility and documented in the SJSU TMA Work Management System.

**f) Group Lockout<sup>10</sup>**

- i) When servicing and/or maintenance is performed by a crew, trade, department or other group, every employee in the group will be afforded the opportunity to apply their own personal lockout device.
- ii) Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout device, such as a group lock box.
- iii) Every authorized employee shall affix a personal lockout device to the group lockout device, or group lockbox, when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

“Stops working” means the end of the shift or when the employee is no longer present at the job site. The lockout device represents the physical presence of the authorized employee while on the jobsite.

<sup>9</sup> CCR T8 §3314. The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, Including Lockout/Tagout. (g) Hazardous Energy Control Procedures.

<sup>10</sup> 29 CFR 1910.147(f)(3) Group lockout or tagout.



**g) Shift or Personnel Changes.**

- i) Oncoming employees will apply their own personal lockout device as the off-going employee removes their device to ensure the continuity of lockout protection.
- ii) If there is no oncoming employee, the off-going employee will remove their personal lockout device and apply a general lockout device with a tag containing the date, reason and contact information.

**h) Energized Electrical Work Permit<sup>11</sup>**

- i) Live parts that are not placed in an electrically safe work condition shall be considered energized electrical work and shall be performed by written permit only.
- ii) The permit is issued and approved by the appropriate administrator.
- iii) Completed Energized Electrical Work Permits are retained by the Environmental Health and Safety Section for one year.
- iv) The written work permit will include, but not be limited to,
  - (1) A description of the circuit and equipment worked on,
  - (2) Justification of the work,
  - (3) Safe work practices,
  - (4) Results of a shock hazard analysis,
  - (5) Determination of the shock boundaries,
  - (6) Results of the flash hazard analysis,
  - (7) The flash protection boundary,
  - (8) The necessary personal protective equipment,
  - (9) Means to restrict access,
  - (10) Evidence of the Job Briefing and Planning, and
  - (11) Energized work permit approval signatures.
- v) The Job Briefing and Planning Checklist is detailed in Appendix C.
- vi) The Energized Electrical Work Permit is detailed in Appendix D.

**i) Personal Protective Equipment (PPE)**

- i) PPE is obtained through the first line supervisor of the affected department.
- ii) PPE is provided to employees at no cost.
- iii) Training in the use of the appropriate PPE for specific tasks or procedures is provided by the first line supervisor.
- iv) The types of PPE available to employees include gloves, eye protection, and outer garments as necessary and are detailed in Appendix E.

---

<sup>11</sup> NFPA 70E – The Energized Electrical Work Permit – 2004

## 5) Employee Training

- a) All employees who have occupational exposure to electrical and uncontrolled energy sources receive initial training at the time of assignment and annual refresher training. The key training elements are summarized in Appendix F.
- b) Employees will participate in an annual periodic inspection of the energy control procedures to evaluate the effectiveness of the written procedures. The inspection will include a review of the authorized employee's responsibilities under the hazardous energy control procedure being inspected as detailed in Appendix G.
- c) Training is coordinated by San Jose' State University, Environmental Health and Safety Section, and are available at the Environmental Health and Safety Office located in the Industrial Studies Building, Room 134 B.

## 6) Recordkeeping

- a) Training Records
  - i) Records are retained for each employee upon completion of training. These documents will be kept for at three years at San Jose' State University, Environmental Health and Safety Section, Industrial Studies, Room 134 B.
  - ii) The training records include:
    - (1) The dates of the training sessions.
    - (2) The contents or a summary of the training sessions.
    - (3) The names and qualifications of persons conducting the training.
    - (4) The names and job titles of all persons attending the training sessions.
  - iii) Employee training records are provided upon request to the employee or the employee's authorized representative. Such requests should be addressed to San Jose' State University, Environmental Health and Safety Section.
- b) Energized Electrical Work Permit Records
 

Completed Energized Electrical Work Permits with the accompanied Job Briefing and Planning Checklist will be retained for one year by the Environmental Health and Safety Section.

## 7) Document History and Control

The San Jose' State University Electrical Safety and Energy Control Program described herein supersedes all prior program documents.

<i>Rev #</i>	<i>Document Revision History</i>	<i>Author</i>	<i>Reviewer</i>	<i>Date</i>
00	Revision No Change Initial Document	David Krack, Director Environmental Health and Safety	Adam Bayer, Director Utilities Maintenance & Operations Kym Bersuch, SETC Safety Representative	September 2, 2011
01				

**Appendix A**

**Nature of Exposure Risk**

Electrical Shop

Plumbing Shop

HVAC Shop

Control Shop

**Page intentionally left blank.**

## Nature of Exposure Risk

### Electrical Shop Tasks with Potential Electrical Hazards

#### 1. Potential Electrical Hazards

- a. Replacing a 15 or 20 amp 110v receptacle or switch.
- b. Disconnecting/reconnecting utilization equipment, 0 – 240 volts.
- c. Disconnecting/reconnecting utilization equipment, rated at 240 to 600 volts.
- d. Voltage testing at utilization equipment rated less than 240 volts.
- e. Voltage testing at utilization equipment rated more than 240 volts.

#### 2. Personal Protective Equipment for other tasks as identified in the NFPA 70E Table Hazard / Risk Category Classifications

- a. 110 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- b. 240 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- c. 277 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.
- d. 480 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.

#### 3. Other Personal Protective Equipment and Tools

- a. Insulating Blanket – for work on energized equipment in wet locations.
- b. Personal Voltage Meter with appropriate training – to verify that equipment is de-energized.
- c. Lockout-Tagout Kit – Locks and tags to lockout equipment once it is verified de-energized.
- d. GFCIs – Ground Fault Circuit Interrupters – for working with corded equipment/ power tools in wet locations.
- e. Flash Blanket / Panel Board Cover – with “High Voltage” warning label on it.

## Nature of Exposure Risk

### Plumbing Shop Tasks with Potential Electrical Hazards

#### 1. Potential Electrical Hazards

- a. Manhole entry in proximity of high voltage (up to 12 kv).
- b. 110, 240 and 480 volt pump maintenance.
- c. 110, 277 and 480 volt water heater/heat exchange maintenance.
- d. Main Well Control Panel Operation (up to 480 v)
- e. 110 volt solenoid valve maintenance.
- f. Use of Core Drill rig and other corded equipment in wet/flooded areas.
- g. Use of Snake in sump pits (possible entanglement in pump electrical lines)
- h. Use of Pipe fuse sealing equipment (exposed energized wires at 110 volts)
- i. Use of extension cords in wet/flooded areas.

#### 2. Personal Protective Equipment for other tasks as identified in the NFPA 70E Table Hazard / Risk Category Classifications

- a. 110 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- b. 240 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- c. 277 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.
- d. 480 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.
- e. 12 kv – Hazard Level 4 – work on insulated cable examination in manhole.  
(Do not enter or work in manholes unless feeder is verified de-energized and locked out.)

#### 3. Other Personal Protective Equipment and Tools

- a. Insulating Blanket – for work on energized equipment in wet locations.
- b. Personal Voltage Meter with appropriate training – to verify that equipment is de-energized.
- c. Lockout-Tagout Kit – Locks and tags to lockout equipment once it is verified de-energized.
- d. GFCIs – Ground Fault Circuit Interrupters – for working with corded equipment/ power tools in wet locations.

## Nature of Exposure Risk

### HVAC Shop Tasks with Potential Electrical Hazards

#### 1. Potential Electrical Hazards

- a. Manhole entry in proximity of high voltage (up to 12 kv).
- b. 110, 240 and 480 volt motor maintenance.
- c. 110, 277 and 480 volt MCC maintenance.
- d. 110, 240 and 480 volt refrigeration unit maintenance.
- e. 110 volt solenoid valve maintenance.
- f. 440 volt refrigeration compressor maintenance.
- g. Use of extension cords in wet/flooded areas.

#### 2. Personal Protective Equipment for other tasks as identified in the NFPA 70E Table Hazard / Risk Category Classifications

- a. 110 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- b. 240 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- c. 277 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.
- d. 480 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.
- e. 12 kv – Hazard Level 4 – work on insulated cable examination in manhole.  
(Do not enter or work in manholes unless feeder is verified de-energized and locked out.)

#### 3. Other Personal Protective Equipment and Tools

- a. Insulating Blanket – for work on energized equipment in wet locations.
- b. Personal Voltage Meter with appropriate training – to verify that equipment is de-energized.
- c. Lockout-Tagout Kit – Locks and tags to lockout equipment once it is verified de-energized.
- d. GFCIs – Ground Fault Circuit Interrupters – for working with corded equipment/ power tools in wet locations.

## Nature of Exposure Risk

### Control Shop Tasks with Potential Electrical Hazards

#### 1. Potential Electrical Hazards

- a. 220 and 480 volt VFD maintenance.
- b. 480 volt MCC maintenance.
- c. 240 volt package unit maintenance.
- d. 24 and 110 volt control relay maintenance.

#### 2. Personal Protective Equipment for other tasks as identified in the NFPA 70E Table Hazard / Risk Category Classifications

- a. 110 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- b. 240 volts – Hazard Level 1 – work on energized parts including voltage testing that requires Voltage Rated gloves and tools.
- c. 277 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.
- d. 480 volts – Hazard Level 2 – work on energized parts including voltage testing that requires Voltage Rated gloves, tools AND double layer switching hood and hearing protection.

#### 3. Other Personal Protective Equipment and Tools

- a. Insulating Blanket – for work on energized equipment in wet locations.
- b. Personal Voltage Meter with appropriate training – to verify that equipment is de-energized.
- c. Lockout-Tagout Kit – Locks and tags to lockout equipment once it is verified de-energized.
- d. Fuse Pullers – to safely remove fuses.
- e. GFCIs – Ground Fault Circuit Interrupters – for working with corded equipment/ power tools in wet locations.



**Appendix B**

**Qualified Electrical Workers**

**Authorized Lockout Workers**



**Page intentionally left blank.**

## Qualified Electrical Workers Authorized Employee (Lockout)

The employees whose names are listed below have an occupational exposure to electrical and uncontrolled energy sources. They are qualified and authorized to perform work on systems, equipment and machinery by way of their training and work experience as defined below.

- a) "Qualified Electrical Worker" is a qualified person who by reason of a minimum of two years of training and experience with high-voltage circuits and equipment and who has demonstrated by performance familiarity with the work to be performed and the hazards involved.
- b) "Authorized employee" means a qualified person who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties including performing cleaning, repairing, servicing, setting-up and adjusting operations.
- c) "Affected employee" means an employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting-up or adjusting operations are being performed under lockout, or whose job requires the employee to work in an area in which such activities are being performed under lockout.

Date Qualified	Department / Work Group	Employee Name	Qualification	Training Courses Completed
April 2008	Auto Shop	Duval, Travis	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Auto Shop	Gorvad, John	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Auto Shop	Ramirez, David	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Carpenter Shop	Gorvad, Jim	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Carpenter Shop	Payan, James	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Carpenter Shop	Pulido, Wilfredo	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Central Plant	Maynard, Peter		
April 2008	Central Plant	Miginnis, Otis	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Central Plant	Miginnis, Otis	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Central Plant	Ordenez, Jose	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Central Plant	Ordenez, Jose	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)

<b>Date Qualified</b>	<b>Department / Work Group</b>	<b>Employee Name</b>	<b>Qualification</b>	<b>Training Courses Completed</b>
April 2008	Central Plant	Osha, Aldren	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Central Plant	Osha, Aldren	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours).
April 2008	Central Plant	Owyang, Sean		
April 2008	Central Plant	Patinio, Armondo	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Central Plant	Patinio, Armondo	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Central Plant	Richardson, Jeff	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Central Plant	Richardson, Jeff	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Central Plant	Vixney, Duong	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Central Plant	Vixney, Duong	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Control Shop	Aguila, Reynaldo	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Control Shop	Leon, Jesus	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Control Shop	Taylor, Jeffrey	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Chesterman, John	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Chesterman, John	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Costello, Lee	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Costello, Lee	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Davis, Frank	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Davis, Frank	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Galang, Ramon	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Galang, Ramon	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Kuntz, Thomas		



# Electrical Safety and Energy Control Program

## Environmental Health and Safety

Date Qualified	Department / Work Group	Employee Name	Qualification	Training Courses Completed
April 2008	Electrical Shop	Williams, Ralph	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Electrical Shop	Williams, Ralph	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Adams, Daryn	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Atajar, Ariel		
April 2008	HVAC Shop	Barnette, Leroy	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Dayanghirang, Rodante	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Filice, Robert	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Gardias, Piotr	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Rodriguez, Ernest	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	HVAC Shop	Tran, Alexander	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Operations	Bayer, Adam	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Operations	Bayer, Adam	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours).
April 2008	Operations	Bersuch, Kym	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Operations	Nordby, Chris	High Voltage	NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)
April 2008	Operations	Nordby, Chris	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Plumbing Shop	Buchanan, Matt	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Plumbing Shop	Garcia, Regino	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Plumbing Shop	Kerrebijn, Mike	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Plumbing Shop	Laird, Lance		
April 2008	Plumbing Shop	Perez, Alfred	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)
April 2008	Plumbing Shop	Tarnowski, Gary	Low Voltage Lockout	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)



**SAN JOSÉ STATE**  
UNIVERSITY

# Electrical Safety and Energy Control Program

Environmental Health and Safety

**Appendix C**

**Work on Energized Electrical Systems**

**The Job Briefing and Planning Checklist**

**Page intentionally left blank.**



## Work on Energized Electrical Systems

### Job Briefing and Planning Checklist

<b>√ IDENTIFY</b>		<b>√</b>	
<input type="checkbox"/>	The hazards.	<input type="checkbox"/>	The shock protection boundaries:
<input type="checkbox"/>	The voltage levels involved.	<input type="checkbox"/>	The available incident energy.
<input type="checkbox"/>	Skills required.	<input type="checkbox"/>	Potential for arc flash.
<input type="checkbox"/>	Any "foreign" (secondary source) voltage source.	<input type="checkbox"/>	Conduct a flash hazard analysis.
<input type="checkbox"/>	Number of people needed to do the job.	<input type="checkbox"/>	Flash protection boundary.
<b>√ ASK</b>			
<input type="checkbox"/>	Can the equipment be de-energized?		
<input type="checkbox"/>	Are back-feeds of the circuits to be worked on possible?		
<input type="checkbox"/>	Is a "standby person" required?		
<b>√ CHECK</b>		<b>√</b>	
<input type="checkbox"/>	Job Plans.	<input type="checkbox"/>	Safety procedures.
<input type="checkbox"/>	Single-line diagrams and vendor prints.	<input type="checkbox"/>	Vendor information.
<input type="checkbox"/>	Status board.	<input type="checkbox"/>	Individuals are familiar with the facility.
<input type="checkbox"/>	Information on plant and vendor resources is up to date.	<input type="checkbox"/>	
<b>√ KNOW</b>		<b>√</b>	
<input type="checkbox"/>	What the job is.	<input type="checkbox"/>	Who is in charge.
<input type="checkbox"/>	Who else needs to know – Communicate!	<input type="checkbox"/>	
<b>√ THINK</b>		<b>√</b>	
<input type="checkbox"/>	About the unexpected event ... What if?	<input type="checkbox"/>	Install and remove grounds.
<input type="checkbox"/>	Lock – Tag – Test – Try.	<input type="checkbox"/>	Install barriers and barricades.
<input type="checkbox"/>	Test for voltage – FIRST.	<input type="checkbox"/>	What else ...?
<input type="checkbox"/>	Use the right tools and equipment, including PPE:	<input type="checkbox"/>	
<b>√ PREPARE FOR AN EMERGENCY</b>		<b>√</b>	
<input type="checkbox"/>	Is the standby person CPR trained?	<input type="checkbox"/>	What is the exact work location?
<input type="checkbox"/>	Is the required emergency equipment available? Where is it?	<input type="checkbox"/>	How is the equipment shut off in an emergency?
<input type="checkbox"/>	Where is the nearest telephone?	<input type="checkbox"/>	Are the emergency telephone numbers known?
<input type="checkbox"/>	Where is the fire alarm?	<input type="checkbox"/>	Where is the fire extinguisher?
<input type="checkbox"/>	Is confined space rescue available?	<input type="checkbox"/>	Are radio communications available?

NFPA 70E – Job Briefing and Planning Checklist – 2004



**Page intentionally left blank.**

**Appendix D**

**Work on Energized Electrical Systems**

**The Energized Electrical Work Permit**



**Page intentionally left blank**

## Work on Energized Electrical Systems

### Energized Electrical Work Permit

<b>PART I: TO BE COMPLETED BY THE REQUESTER</b>	
Requester Name:	<b>Work Order Number:</b>
1 Description of circuit/equipment/job location:	
2 Description of work to be performed:	
3 Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage:	
X	
Requester Signature	Title Date:
<b>PART II: TO BE COMPLETED BY THE QUALIFIED ELECTRICAL PERSONS DOING THE WORK:</b>	
	<b>Check when Complete ✓</b>
1 Detailed job description procedure to be used in performing the above detailed work:	<input type="checkbox"/>
2 Description of the Safe Work Practices to be employed:	<input type="checkbox"/>
3 Results of the Shock Hazard Analysis:	<input type="checkbox"/>
4 Determination of Shock Protection Boundaries:	<input type="checkbox"/>
5 Results of the Flash Hazard Analysis:	<input type="checkbox"/>
6 Determination of the Flash Protection Boundary:	<input type="checkbox"/>
7 Necessary personal protective equipment to safely perform the assigned task:	<input type="checkbox"/>
8 Means employed to restrict the access of unqualified persons from the work area:	<input type="checkbox"/>
9 Evidence of completion of a Job Briefing including discussion of any job-related hazards:	<input type="checkbox"/>
10 Do you agree that the work described above can be performed safely?	Yes <input type="checkbox"/> No <input type="checkbox"/> If no, return to requester.
X	
Electrically Qualified Person	Date
X	
Electrically Qualified Person	Date
<b>Part III: APPROVAL(S) TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED:</b>	
X	
Manager/Supervisor	Date
X	
Appropriate Administrator	Date
<b>Forward this form to the EHS Department when the work is complete</b>	

**Page intentionally left blank.**

**Appendix E**

**Electrical Work Personal Protective Equipment**

**Page intentionally left blank.**



## Arc Flash Kit – 10 Cal/cm<sup>2</sup>

Arc Flash Kit, Coveralls Garmet Style, Arc Rating 8 Cal/cm<sup>2</sup>, Material Flame Resistant Cotton, Polycarbonate Lens, Amber Lens Color, Ratchet Suspension, Thickness 0.06 In, Viewing Area 8 x 14 In, Standards ASTM F1506 and NFPA 70E, Includes Arc Flash Coverall, AS1000HAT Hard Hat With Arc Face shield, AFHOOD 10 Cal/cm<sup>2</sup>, Large Nylon Storage Bag, Face shield Canvas Storage Bag, Balaclava and Safety Eyewear

<b>0</b>	<b>SALISBURY Arc Flash Kit – 10 Cal/cm<sup>2</sup></b>	<b>Grainger Catalog Item #5EU47</b>
1	Item	Arc Flash Kit
2	Garment Style	Coveralls
3	Color	Navy Blue
4	Material	Flame Resistant Cotton
5	Arc Rating	8 Cal/cm <sup>2</sup>
6	Lens	Polycarbonate
7	Lens Color	Amber
8	Suspension	Ratchet
9	Thickness	0.06"
10	Thread	Flame Resistant
11	Viewing Area	8 x 14"
12	Hazard Risk Category (HRC)	2
13	For Use With	Insulating Rubber Gloves and Leather Protectors (Not Included)
14	Standards	ASTM F1506 and NFPA 70E
15	Includes	Arc Flash Coverall AS1000HAT Hard Hat With Arc Face shield AFHOOD 10 Cal/cm <sup>2</sup> Large Nylon Storage Bag Faceshield Canvas Storage Bag Balclava (hood) Safety Eyewear
16	Order separately	00 Gloves Ugly's 2009 NFPA70E pocket reference Glove guide card Hazard boundary wallet card

## Arc Flash Kit – 40 Cal/cm<sup>2</sup>

Arc Flash Kit, Coat, Bib Overall With Hood Garmet Style, Color Gray, Arc Rating 40 Cal/cm<sup>2</sup>, Material Flame Resistant Cotton, Dual Layer Polycarbonate Lens, Amber Lens Color, Ratchet Suspension, Thickness 0.06 In Each Layer, Viewing Area 10 x 20 In, Standards ASTM F1506 and NFPA 70E, Includes Arc Flash Coat, Bib Overalls, PRO-Hood, Face Shield w/Hard Hat, Storage Bag and Safety Eyewear

<b>0</b>	<b>SALISBURY Arc Flash Kit – 40 Cal/cm<sup>2</sup></b>	<b>Grainger Catalog Item #6WU89</b>
1	Item	Arc Flash Kit
2	Garment Style	Coat, Bib Overall With Hood
3	Color	Gray
4	Material	Flame Resistant Cotton
5	Arc Rating	40 Cal/cm <sup>2</sup>
6	Lens	Dual Layer Polycarbonate
7	Lens Color	Amber
8	Suspension	Ratchet
9	Thickness	0.06" Each Layer
10	Thread	Flame Resistant
11	Viewing Area	10 x 20"
12	Hazard Risk Category (HRC)	4
13	For Use With	Insulating Rubber Gloves and Leather Protectors (Not Included)
14	Standards	ASTM F1506 and NFPA 70E
15	Includes	Coat, Overalls, Arc Flash Hood, Face Shield w/Hard Hat, Safety Glasses, Storage Bag
16	Order separately	(V rated) Gloves Ugly's 2009 NFPA70E pocket reference Glove guide card Hazard boundary wallet card

**Appendix F**

**Electrical Safety and Energy Control Training**



**Page intentionally left blank.**

## Electrical Safety and Energy Control Training Requirements

0	Qualified Electrical Worker (HV)	Qualified Person (LV - Lockout)	Topics	Frequency	Duration	Training Delivery Mode
1	O		NTT High Voltage Equipment (8 hours) NTT Central Plant Operations (8 hours) NTT Distribution System Cabling and Manholes (8 hours) NTT Building Equipment (8 hours)	Initial Assignment	32 Hours	Contract Trainer
2	O		NTT Central Plant Operations NTT Distribution System Cabling and Manholes NTT Building Equipment	Annually	8 Hours	Contract Trainer / In-house Trainer
3		O	NTT Safety Clothing, Switching, Isolation, Lockout, (8 hours). NTT Voltage Detection and Grounding (8 hours). NTT Low Voltage Equipment (8 hours). NTT Building Equipment (8 hours)	Initial Assignment	32 Hours	Contract Trainer
4		O	NTT Building Equipment (Inspection of Procedures)	Annually	8 hours	Contract Trainer / In-house Trainer
5	O	O	NFPA 70E Arc Flash Refresher Training	Annually	8 Hours	Contract Trainer
6	O	O	First Aid & CPR w/AED	Annually	8 Hours	Contract Trainer
7	O	O	Confined Space Entry	Annually	4 Hours	Contract Trainer / In-house Trainer

*NTT – National Technology Transfer, Inc., (A Contract Training Resource to SJSU)*



**Page intentionally left blank.**

**Appendix G**

**Annual Periodic Inspection of the Energy Control Procedures**



**Page intentionally left blank.**



## **San Jose State University      Demonstration of Lockout/Tagout**

Employee Name	Building	Date:
Employee No.	Equipment Name	Manager's Name
Organization:	Equipment ID	Mgr's Telephone No.

√- Yes X- No	<b>A</b>	<b><i>Prior to the demonstration of Lockout/Tagout, is the Authorized Employee prepared with the necessary tools, equipment and skills as listed below?</i></b>
	1	Has the employee attended a San Jose State University Lockout/Tagout training class?
	2	Was the employee able to locate the written Lockout/Tagout Procedure for the equipment?
	3	Did the employee have the necessary Lockout/Tagout locks to perform the procedure?
	4	Did the employee have the necessary Lockout/Tagout tags to perform the procedure?
	5	Did the employee have the necessary Personal Protective Equipment?

√- Yes X- No	<b>B</b>	<b><i>Practical Demonstration of Lockout/Tagout Procedures</i></b>
	1	<b>Notification of Affected Employees?</b>
	2	<b>Preparation for Shutdown?</b> – Grasp the situation, knowledge of the type and magnitude of energy, the hazards of the energy and the methods to control the energy.
	3	<b>Orderly shutdown of the machine or equipment?</b>
	4	<b>Energy isolation devices are physically located?</b>
	5	<b>Locks and/or tags are affixed to each energy-isolating device?</b> Locks and lockout devices are affixed in a manner that will hold the energy isolating devices in a “safe” or “off” position. Tags are attached with each lock and at energy isolation devices which cannot be locked.
	6	<b>Stored energy or residual energy is relieved, disconnected, restrained, and rendered safe?</b>
	7	<b>Verification of Isolation?</b> Attempt to start the machine or equipment to verify de-energization.

√- Yes X- No	<b>C</b>	<b><i>Release from Lockout/Tagout</i></b>
	1	<b>Machines and Equipment are inspected</b> to ensure that nonessential items are removed?
	2	<b>Employees and work areas are checked</b> to ensure that all employees are safely positioned or removed?
	3	<b>The employee who applied the devices removes the lockout devices?</b>
	4	<b>Employee Notification?</b> Notify affected employees that the lockout devices are removed.

√- Yes X- No	<b>D</b>	<b><i>Employee Practical Demonstration</i></b>
	<b>Ω</b>	<i>The Authorized Employee whose name is listed below has successfully demonstrated his/her ability to perform Lockout/Tagout as documented above.</i>

Employee's Signature

Date

Trainer's Signature

Date

Employee's Printed Name

Trainer's Printed Name