The School District of Philadelphia

The School District of Philadelphia Procedures for:

Electrical and Machinery Safeguarding Program

The School District of Philadelphia

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The School District of Philadelphia

I. Introduction

This program provides The School District of Philadelphia employees with the minimum safety requirements for protecting themselves from potential hazards associated with electricity and machines hazards that may cause serious injury.. By following these basic safety principles and maintaining proper safety awareness, employees should be able to avoid serious injury.

II. Standards

The following procedures are in compliance with the safety standards and regulations that pertain to electrical and machine safety, including, but not limited to:

- American National Standards Institute (ANSI) Standards. In most cases there are specific ANSI standards for specific machines, types of machines, and type of hazards.

- Occupational Safety and Health Administration (OSHA) Standards
  OSHA 29 CFR 1910, Subpart O - Machinery and Machine Guarding
  OSHA 29 CFR 1910, Subpart S - Electrical

- National Electrical Code, NFPA 70

III. Responsibilities

The information in this program applies to all School District of Philadelphia employees working on, near, or with electricity and/or machines.

First line supervision should:

- Evaluate staff work areas for compliance with this program,
- Assure the resources are available to meet the needs,
- Conduct the required inspections of areas for which they are responsible
- Ensure personnel are familiar with these procedures and adhere to its guidelines,
- Develop more detailed procedures when necessary.

AIPP Coordinator or designee is available to provide guidance and evaluating the administration of this procedure.

Employees should:

- Be familiar with and adhere to all aspects of this procedure that apply to their work activities.
- Directed any questions regarding the requirements to their supervision.

Each department will create additional specific procedures applicable to the nature of work taking place.

IV. Electrical Safety

The basic cause of electrical accidents usually is one of a combination of the following:

- Unsafe acts
- Unsafe equipment and installation,
- Unsafe environment,

This section provides the basic minimum procedures for electrical safety related to work practices for working on, near, or with electricity.

Electrical safety is achieved through the proper use and installation of electrical equipment. Employees must be properly instructed concerning electrical hazards in their workplaces and understand the necessary safe work practices to avoid injury. Specific electrical hazards in each department shall be addressed to employees that have responsibilities to operate equipment in that department. ***Due to the potential for serious injury, all electrical hazards and/or incidents should be reported immediately.*** All training to meet these requirements must be documented by each employee's supervisor.

A. Examination, Installation, and Use of Electrical Checklists

- All electrical equipment shall be installed and examined to ensure it is free from recognized hazards that are likely to cause death or serious physical harm to district employees.

B. Overloaded Outlets

Insufficient or overloading of electrical outlets is not allowed. A sufficient number of outlets will eliminate the need for extension cords. Overloading electrical circuits and extension cords can result in a fire.

C. Unsafe/Non-Approved Equipment

The use of poorly maintained or unsafe, poor quality, non-approved equipment, including office equipment and appliances (often provided by or used by employees) is not allowed. Such equipment can develop electrical shorts creating fire and/or shock hazards. Equipment and cords should be inspected regularly, and removed if damaged.

D. Defective frayed or improperly installed cords

Electric Cords should be examined on a routine basis for fraying and exposed wiring. Damaged cords must be reported to the supervisor, put out of use and replaced.

E. Electrical Cords across Walkways and Work Areas

An adequate number of outlet sockets should be provided. Extension cords should only be used in situations where fixed wiring is not feasible. However, if it is necessary to use an extension cord, never run it across walkways or aisles due to the potential tripping hazard. If you must run a cord across a walkway, either tape it down or purchase a cord runner.

F. Live Parts Unguarded

Wall receptacles should be designed and installed so that no current carrying parts will be exposed, and outlet plates should be kept tight to eliminate the possibility of shock.

G. Pulling of Plugs to Shut Off Power

Switches to turn on and off equipment should be provided, either in the equipment or in the cords, so that it is not necessary to pull the plugs to shut off the power. To remove a plug from an outlet, take a firm grip on and pull the plug itself. Never pull a plug out by the cord.

H. Working on "Live Equipment"

Disconnect electrical machines before cleaning, adjusting, or applying flammable solutions. For equipment other than cord and plug, lockout tag out practices must be used. If a guard is removed to clean or repair parts, replace it before testing the equipment and returning the machine to service.

I. Marking

Electrical equipment must not be used unless marked with the manufacturer's name, trademarks, or other markings identifying the organization responsible for the product. Other markings shall be provided indicating voltage, current,

wattage, or other ratings as necessary and shall be of sufficient durability to withstand the given environment. Each electrical disconnect switch and its service required for motors and appliances must be legibly marked indicating its purpose, unless located so the purpose is evident.

J. Working Clearances (Blocking Electrical Panel Doors)

Indoor areas' containing electrical equipment such as disconnects and electrical panels shall be maintained in a clean and orderly fashion, shall not be used as storage, and will have adequate illumination. Electrical panel doors should always be kept closed, to prevent "electrical flashover" in the event of an electrical malfunction. ***Under no circumstances shall any employee place any object within 36 inches of the front of an electrical panel.***

K. Equipment for General Use

- Fixtures installed in wet or damp locations must be approved for the purpose and be water-tight so water cannot enter or accumulate so as to contact electrical parts.

- Provisions must be made for sufficient diffusion and ventilation of gases from storage batteries to prevent the accumulation of explosive gases.

L. Hazardous Locations

Hazardous (classified) locations are locations that are electrically classified depending on the properties of flammable vapors, liquids or gases, or combustible dusts or fibers which may be present normally or in case of an accidental release. All electrical equipment installed or used in hazardous locations must be approved (labeled) for that specific service.

HAZARDOUS (classified) LOCATIONS

CLASS	DIVISION	DESCRIPTION
I	1	Volatile flammable liquids or gases are present normally.
I	2	Volatile flammable liquids or gases were handled, processed or stored, but normally confined and can escape only in an accident.
II	1	Combustible dust normally present.
II	2	Combustible dust is not normally in air in quantities sufficient to produce explosive or ignitable mixtures.
III	1	Easily ignitable fibers or materials producing combustible flying

CLASS	DIVISION	DESCRIPTION
		materials are handled, manufactured, or used.
III	2	Easily ignitable fibers are stored or handled, except in process or manufacture.

M. Electrical work on Construction Site

All temporary and permanent electrical installations in the School District of Philadelphia facilities shall be per the latest version of the National Electrical Code and bid specifications. All Construction Safety Manual general guidelines apply to all Contractors/Subcontractors working on construction project.

N. Work on or near live electrical parts

Work on or near live electrical conductors or circuit parts must be performed by employees who are qualified and trained. A permit is to be used.

No work shall take place on equipment with live electrical parts by any School district personnel unless prior approval by the supervisor and of the AIPP coordinator or designee properly trained in electrical or machine guarding safety. Only then will work resume if it can be demonstrated that de-energizing the parts either: a) introduces additional hazards, or; b) is infeasible due to the work to be performed or equipment design.

All appropriate Personal Protective Equipment shall be worn at all time when working on or near electrical and machines parts.

V. Machine Safety

Machine hazards are a major cause of accidents and must be identified and controlled to avoid injury to employees working on/or near one of the machines. Any machine motion or condition that can cause injury is considered hazardous and must be guarded. Employees working on equipment with moving parts, pinch points or nip points are not permitted to reach past a guard for any reason without shutting down the machine and locking/tagging out the main power source. This policy must be enforced by supervision.

In addition, any guarding supplied by the manufacturer must remain in place on the equipment, except during properly protected repair and maintenance that utilizes energy neutralization procedures, such as Lockout/Tag out. (See Department's Lockout/Tag out Program). **All guards shall be re-installed before the equipment is returned to service.**

The major areas of safety that must be considered for every machine:

- Maintenance, Servicing and adjustment,
- Points of operation where the machine works on materials, and
- Protection from moving parts, other than points of operation.

A. Maintenance, Servicing and Adjustment

1. All personnel performing servicing and maintenance of machines must be properly trained, qualified, and competent to perform the task.

2. Only authorized employees are permitted to perform servicing and maintenance on machines in accordance with the written Lockout/Tag out Procedures.

B. Machine Safeguards

One or more methods of machine guarding must be used to protect the operator and others in the machine area from hazards such as:

- Points of operation
- In-going nip points,
- Rotating parts,
- Flying chips and sparks.

C. Safeguard Requirements

All machine safeguards must:

- Conform to or exceed ANSI and OSHA requirements,
- Be considered a permanent part of the machine,
- Afford maximum protection,
- Prevent access to danger zone during operation,
- Not weaken the structure of the machine,
- Not interfere with machine operation,
- Be designed for the specific machine and job,
- Be fire and corrosive resistant,
- Be durable, and
- Not be a source of additional hazard.

Safe Work Practices*:*

1. Employees must never remove guards on machines or equipment.

2. Only a qualified person trained in the procedure as a normal part of his or her job duties is allowed to remove guards after following the Lock Out Tag Out procedures.

3. Do not start machinery unless guards are in place and in good condition.

4. Report missing guards immediately to your supervisor.

5. If maintenance is performed, guards must be returned before power is restored to the machine and lockout/tag out devices are removed.

6. Employees are not permitted to work on or around equipment while wearing loose clothing, jewelry or long hair that is not tied back.

7. Machine operators shall be instructed in safe work practices.

8. Each machine should have a power control device at the point of operation.

VI. Hazard Checklist

To assist employees in checking workplaces to assure that recognized hazards are identified and any defects are promptly corrected.

Each department and/or unit is responsible for establishing monthly self-inspections of their facilities. The Machinery Safeguarding Hazard Checklist should be completed by the inspectors (designated) and copies forwarded to the department supervisor. Each department must ensure the proper follow-up to correct all defects. All inspection reports must be filed by the department for future reference.

VII. Training Requirements

All personnel working on or around live electrical equipment or on machine shall be trained in this procedure prior to performing hazardous work activities. Training shall be completed when employees change job duties or when new equipment is introduced into their work environment.

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Appendix A

SELF-INSPECTION ELECTRICAL CHECKLIST for ELECTRICIANS

Date:_____ **Proper Protection Provided**

Description	Yes	No
Electrical insulation adequate		
Splices 1. Conductors properly spliced or joined with splicing devices		
Arcing parts 1. Arcing/sparking equipment isolated from combustibles		
Marking 1. Manufacturer, voltage, current, wattage, and other ratings listed		
Identification of disconnecting means and circuits 1. Disconnecting means for motors/appliances legibly marked 2. Service, feeder, and branch circuit, at its disconnecting means or over-current device legibly marked		
600 volts, nominal or less 1. Working space about electrical equipment a. Sufficient access and working space provided/maintained about all electrical equipment b. At least one entrance provided to working space c. Illumination adequate d. Minimum head room six feet, three inches e. Live parts of electrical equipment operating at 50+ volts guarded against accidental contact or elevated at eight feet or more above working surface f. Entrances to rooms and other guarded locations containing exposed live parts marked with conspicuous warning signs		
Over 600 volts, nominal 1. Electrical installations with exposed live parts accessible only to qualified persons 2. Kept locked and guarded 3. Access to electrical installations to unqualified persons prohibited		
Work space about equipment 1. Sufficient space provided/maintained to permit safe operation/maintenance		
Wiring design and equipment 1. Use/identification of grounded/grounding conductors a. Grounded conductors identifiable and distinguishable from other conductors		

b. Equipment grounding conductor identifiable and distinguishable from other conductors 2. Clearance from ground/other a. Open conductors: ten feet above finished grade b.Twelve feet over areas subject to vehicles c. Fifteen feet if subject to truck traffic d. Eighteen feet over public streets and driveways e. Minimum of three feet clearance from windows, doors, fire escapes, or similar locations f. Conductors eight feet from highest point of roofs over which they pass		
Services 1. Means provided to disconnect all conductors from service entrance conductors 2. Disconnecting means indicates whether it is open or closed 3. Disconnecting means installed at a readily accessible location 4. Each service disconnecting means indicates whether it is open or closed 5. Service entrance conductors installed as open wires guarded to make them accessible only to qualified persons		
High voltage warning signs posted over current protection 1. Conductors and equipment protected from over current 2. Cartridge fuses on circuits over 150 volts to ground 3. Over current devices accessible to employees 4. Over current devices located away from physical damage or combustibles 5. Breakers indicate whether open (off) or closed (on) 6. Feeders and branch circuits over 600 volts have short-circuit protection		
Grounding 1. Neutral conductor grounded on 3-wire DC systems 2. Path to ground permanent and continuous 3. Metal cable trays, metal raceways, and metal enclosures for conductors grounded 4. Non-current carrying metal parts of fixed equipment grounded 5. Non-current carrying metal parts of cord and ploy-connected equipment grounded 6. Fixed equipment, grounding conductors in same raceway, cable or cord, as circuit conductor 7. Equipment grounding conductor separate from circuit conductors for DC currents		
Wiring Methods 1. Metal raceways, cable armor, and other metal enclosure make continuous electric conductor 2. So connected to all boxes, firings, and cabinets as to provide electrical continuity		

3. 300 volts or less temporary wiring used only during/or remodeling, maintenance, or repair 4. Temporary wiring use limited to ninety days 5. Feeders originate in distribution center 6. Conductors run as multi-conductor cord cable assemblies 7. Open conductors on insulators not more than ten feet apart 8. Branch circuit originates in power outlet or panel board 9. Open conductors fastened at ceiling height every ten feet 10. Grounding type receptacles 11. Branch circuits contain separate equipment grounding conductor 12. Receptacles electrically connected to grounding connector 13. Bare conductors and earth returns avoided 14. Disconnecting switches or plug connectors on ungrounded conductors 15. Lamps protected from accidental contact or breakage 16. Flexible cords and cables protected from accidental damage 17. Sharp corners and projected avoided 18. Flexible cords and cables protected against damage		
Flexible nonmetallic tubing 1. In dry locations not exposed to severe physical damage 2. Tubing in continuous lengths not exceeding fifteen feet and secured to surface by straps at intervals not exceeding four feet, six inches		
Cabinets, boxes, and fittings 1. Conductors entering boxes, cabinets, or fittings protected from abrasion 2. Openings effectively closed 3. Unused openings effectively closed 4. Pull Boxes, junction boxes, and fittings provided with covers. 5. Metal covers grounded 6. Outlet boxes have cover face plates 7. Outlet boxes with flexible cords provided with bushings or smooth, well-rounded surfaces		
Pull/junction boxes over 600 volts 1. Cover permanently marked "HIGH VOLTAGE" 2. Marked readily visible and legible		
Switches 1. Knife switches have blades dead when switch is in open position 2. Single throw knife switches not capable of being closed by gravity 3. Single throw knife switches in inverted position have locking device to keep blades open		
Face plates for flush-mounted snap switches 1. Flush snap switches in ungrounded metal boxes and with in reach of conducting floors or surfaces have faceplates of non-conducting, noncombustible material 2. Switchboards with exposed live parts in permanently dry locations 3. Panel boards mounted in cabinets, cutout boxes, or enclosures approved		

with dead front 4. Panel boards accessible only to qualified persons 5. Exposed blades of knife switches dead when open 6. Switches, circuit breakers, and switchboards enclosed in weatherproof enclosures 7. Conductors for general wiring insulated 8. Conductor insulation approved for voltage, operating temperature, and location of use 9. Insulated conductors color/identified as to type		
Flexible cords and cables 1. Not used as substitute for fixed wiring 2. Not run through holes in walls, ceilings or floors 3. Not run through doorways, windows, or similar openings 4. Not attached to building surfaces 5. Not concealed behind walls, ceilings, or floors 6. Flexible cords used without splice or tap 7. Flexible cords provided with strain relief		
Motor disconnecting means 1. Means in sight from controller location 2. If out of sight, is controller marked, giving the location and identification of the disconnect 3. If motor and machinery not in sight from controller, is controller locked in open position		
Equipment for general use 1. Manually operable switch in sight from motor 2. Disconnect indicate whether it is open (off) or closed (on) 3. Disconnect readily accessible 4. Individual disconnect provided for each motor		
Motor overload, short circuit, and ground-fault protection 1. Motors, motor-control apparatus, and motor branch-circuit conductors protected against overheating short circuits and ground faults		
Electric welders: disconnecting means 1. Disconnect provided in supply circuit for arc welder 2. Ampere rating of disconnect not less than supply conductor		
Data processing systems: disconnecting means 1. Disconnect provides power to all electronic equipment in data processing/computer rooms 2. Disconnect controlled from locations accessible to operator at principal exit 3. Disconnect to air conditioning serving area		
Hazardous locations 1. Equipment and wiring used in classified locations are intrinsically safe, approved, or safe for the location 2. Equipment marked to show class, group, and operating temperature for		

which it is approved 3. Temperature marking exceeds ignition temperature of specific gas or vapor		
Conduits 1. Conduits threaded and wrench tight 2. Bonding jumpers utilized where not threaded joint tight		
Emergency power systems 1. Emergency circuit wiring independent of other wiring and equipment 2. Kept from same raceway, cable, box, or cabinet of other wiring 3. Emergency lighting arranged due to the failure of individual lighting element cannot leave any space in total darkness		

Signature:	Date:
Forwarded to:	Date:

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Appendix B

<table>
<tr><th colspan="5">WORK ON OR NEAR LIVE ELECTRICAL PARTS</th></tr>
<tr><td colspan="2">CURRENT DATE/TIME:

WORK LOCATION (circuit/equipment):

WORK TASKS:</td><td colspan="3">PERMIT VALID
TIME DATE

FROM: |_____:_____|
|_____|_____|_____|

TO: |_____:_____|
|_____|_____|_____|</td></tr>
<tr><td colspan="5">JUSTIFICATION: (Describe why it is necessary to work on or near live electrical parts.)</td></tr>
<tr><td>JOB BRIEFING</td><td colspan="2">The information in this permit has been reviewed with individuals conducting work.</td><td>DATE:</td><td>TIME:</td></tr>
<tr><td colspan="3"></td><td>COMPLETE</td><td>N/A</td></tr>
<tr><td rowspan="5">PREPARATION</td><td rowspan="4">Shock Hazard Analysis

Refer to Table 2-1.3.4 of NFPA 70E.</td><td>Voltage:</td><td>☐</td><td rowspan="4"></td></tr>
<tr><td>Prohibited Approach Boundary:</td><td>☐</td></tr>
<tr><td>Restricted Approach Boundary:</td><td>☐</td></tr>
<tr><td>Limited Approach Boundary:</td><td>☐</td></tr>
<tr><td rowspan="2">Flash Protection Boundary</td><td>≤ 600 volts = 4 feet</td><td>☐</td><td>☐</td></tr>
<tr><td>> 600 volts – Contact RMD</td><td>☐</td><td>☐</td></tr>
<tr><td>PPE</td><td>Check all that apply. Refer to Tables 3-3.9.1, 3-3.9.2, and 3-3.9.3 of NFPA 70E.</td><td>☐ Long Sleeve Shirt ☐ Long Pants
☐ Coveralls ☐ Hard Hat
☐ Safety Glasses ☐ Safety Goggles
☐ Face Shield ☐ Flash Suit Hood
☐ Hearing Protection ☐ Leather Gloves
☐ V-Rated Gloves ☐ Leather Work Shoes</td><td>☐</td><td></td></tr>
<tr><td rowspan="4">GENERAL REQUIREMENTS</td><td colspan="2">Two qualified people required at all times</td><td>☐</td><td></td></tr>
<tr><td colspan="2">Unqualified persons restricted from work area</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="2">V-Rated tools used as required (see Table 3-3.9.1 in NFPA 70E)</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="2">Insulating materials used</td><td>☐</td><td>☐</td></tr>
</table>

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LIST PERSONNEL PERFORMING WORK Two Required
_____ _____ _____ Qualified Person Performing Work Qualified Stand-by Person* * Stand-by person must be trained in emergency procedures, first aid and CPR
Signature: _____ Date:_____ Supervisor

Prohibited Approach Boundary – The distance from an exposed lime part within which it is considered the same as making contact with the live part.

Restricted Approach Boundary – No qualified person shall approach or take any conductive object within this approach boundary unless they are insulated or guarded from the live part. Unqualified persons may not enter this boundary.

Limited Approach Boundary – No unqualified person may enter this boundary unless escorted by a qualified person. Caution tape or alternative means shall be used to define this boundary.

Flash Protection Boundary – The distance from exposed live parts within which a person could receive second degree burns if an electrical arc flash occurred. No unqualified persons are allowed within this boundary, and qualified persons must use appropriate PPE and work procedures.

Qualified Person - One who has the skills and knowledge of electrical equipment and installations and has received safety training on the hazards involved.

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Appendix C

TYPES OF MACHINE SAFEGUARDING

Date: _____

All guard methods have their advantages and limitations. The following is a list of many types of guards showing the advantages and limitations:

GUARDS

Method	Safeguarding Action	Advantages	Limitations
Fixed	Provides a barrier	Can be constructed suit may specific applications. In-plant construction is often possible. Can provide maximum protection. Usually requires minimum maintenance. Can be suitable to high production, repetitive operations.	May interfere with visibility. Can be limited to specific operations. Machine adjustment and repair often require its removal, thereby necessitating other means of protection for maintenance personnel.
Interlocked	Shuts off or disengages power and prevents starting of machine when guard is open; should require the machine to be stopped before the worker can reach into the danger area.	Can provide maximum protection. Allows access to machine for removing jams without time-consuming removal of fixed guards.	Requires careful adjustment and maintenance. May be easy to disengage.
Adjustable	Provides a barrier that may be adjusted to facilitate a variety of production operations.	Can be constructed to suit many specific applications. Can be adjusted to admit varying sizes of stock.	Hands may enter danger area - protection may not be complete at all times. May require frequent maintenance and/or adjustment. The guard may be made ineffective by the operator. May interfere with visibility.
Self-Adjusting	Provides a barrier that moves according to the size of the stock entering.	Off-the-shelf guards are often commercially available.	Does not always provide maximum protection. May interfere with visibility. May require frequent maintenance and adjustment.

DEVICES			
Photoelectric (optical)	Machine will not start cycling when the light field is broken by any part of the operator's body during cycling process, immediate	Can allow freer movement for operator.	Does not protect against mechanical failure. May require frequent alignment and the calibration. Excessive vibration may cause lamp filament damage and premature burnout. Limited

	machine braking is activated		to machines that can be stopped.
Radio frequency (capacitance)	Machine cycling will not start when the capacitance field is interrupted. When the capacitance field is disturbed by any part of the operator's body during the cycling process immediate machine braking is activated.	Can allow freer movement for operator.	Does not protect against mechanical failure. Antennae sensitivity must be properly adjusted. Limited to machines that can be stopped.
Electro-mechanical	Contact bar or probe travels a predetermined distance between the operator and the danger area. Interruption of this movement prevents the starting of machine cycle.	Can allow access at the point of operation.	Contact bar or probe must be properly adjusted for each application; this adjustment must be maintained properly.
Pullback	As the machine begins to cycle, the operator's hands are pulled out of the danger area.	Eliminates the need for auxiliary barriers or other interference at the danger area.	Limits movement of operator. May obstruct workspace around operator. Adjustments must be made for specific operations and for each individual. Requires frequent inspections and regular maintenance. Requires close supervision of the operator's use of the equipment.
Restraint (holdback)	Prevents the operator from reaching into the danger area.	Little risk of mechanical failure.	Limits movements of operator. May obstruct workspace. Adjustments must be made for specific operations and each individual. Requires close supervision of the operator's use.
Safety trip controls: Pressure-sensitive body bar; Safety tripod; Safety	Stops machine when tripping.	Simplicity of use.	All controls must be manually activated. May be difficult to activate controls because of their location. Only protects the operator. May require special fixtures to hold work. May require

tripwire			a machine brake.
Two-hand control	Concurrent use of both hands is required, preventing the operator from entering the danger area.	Operator's hands are at a predetermined location. Operator's hands are free to pick up a new part after first half of cycle is completed.	Requires a partial cycle machine with a brake. Some two-hand controls can be rendered unsafe by holding with blocking, thereby permitting one-hand operation. Protects only the operator.
Two-hand trip	Concurrent use of two hands on separate controls prevents hands from being in danger area when machine cycle starts.	Operator's hands are kept away from danger area. Can be adapted to multiple operations. No obstruction to hand feeding. Does not require adjustment for each operation.	Operator may try to reach into danger area after tripping machine. Some trips can be rendered unsafe by holding with arm or blocking, thereby permitting one-hand operation. Protects only the operator. May require special features.
Gate	Provide a barrier between danger area and operator or other personnel.	Can prevent reaching into or walking into the danger area.	May require frequent inspection and regular maintenance. May interfere with operator's ability to see work.

Appendix E

MACHINERY SAFEGUARDING HAZARDS CHECKLIST		
Date: _____ Department: _____		
Mechanical Hazards	**Yes**	**No**
The point of operation: 1. Is there a point-of-operation safeguard provided for the machine? 2. Does it keep the operator's hands, fingers, and body out of the danger area? 3. Is there evidence that the safeguards have been tampered with or removed? 4. Could you suggest a more practical, effective safeguard? 5. Could changes be made on the machine to eliminate the point-of-operation hazard entirely?		
Power transmission apparatus: 1. Are there any unguarded gears, sprockets, pulleys, or flywheels on the apparatus? 2. Are there any exposed belts or chain drives? 3. Are there any exposed set screws, key ways, or collars? 4. Are starting and stopping controls within easy reach of the operator? 5. If there is more than one operator, are separate controls provided?		
Other moving parts: 1. Are safeguards provided for all hazardous moving parts of the machine, including auxiliary parts?		
Non-mechanical Hazards 1. Have appropriate measures been taken to safeguard workers against noise hazards? 2. Have special guards, enclosures, or personal protective equipment been provided, where necessary, to protect workers from exposure to harmful substances used in machine operation?		
Electrical Hazards 1. Is the machine installed in accordance with National Fire Protection Association and National Electrical Code requirements? 2. Are there loose conduit fittings? 3. Is their machine properly grounded? 4. Is the power supply correctly fused and protected? 5. Do workers occasionally receive minor shocks while operating any of the machines?		
Training 1. Do operators and maintenance workers have the necessary training in how		

to use the safeguards and why? 2. Have operators and maintenance workers been trained in where the safeguards are located, how they provide protection, and what hazards they protect against? 3. Have operators and maintenance workers been trained in how and under what circumstances guards can be removed? 4. Have workers been trained in the procedures to follow if they notice guards that are dangerous, missing, or inadequate?		
Protective Equipment and Proper Clothing 1. Is protective equipment required? 2. Have operators and maintenance workers been trained in where the safeguards are located, how they provide protection, and what hazards they protect against? 3. Is the operator dressed safely for the job (that is, no loose fitting clothing or jewelry)?		
Machinery Maintenance and Repair 1. Have maintenance workers received up-to-date instruction on the machinery they service? 2. Do maintenance workers lock out the machine from its power sources before beginning repairs? 3. Where several maintenance persons work on the same machine, are multiple lockout devices used? 4. Do maintenance persons use appropriate and safe equipment in their repair work? 5. Is the maintenance equipment itself properly guarded?		
Other Items to Check 1. Are emergency stop buttons, wires, or bars provided? 2. Are the emergency stops clearly marked and painted red? 3. Are there warning labels or markings to show hazardous areas? 4. Are the warning labels or markings appropriately identified by yellow, yellow and black, or orange colors?		

REQUIREMENTS FOR ALL SAFEGUARDS

REQUIREMENTS	YES	NO
1. Do the safeguards provided meet the minimum OSHA requirements?		
2. Do the safeguards prevent workers' hands, arms, and other body parts from making contact with dangerous moving parts?		
3. Are the safeguards firmly secured and not easily removable?		
4. Do the safeguards ensure that no objects will fall into the moving parts?		

5. Do the safeguards permit safe, comfortable, and relatively easy operation of the machine?		
6. Can the machine be oiled without removing the safeguard?		
7. Is there a system for shutting down the machinery before safeguards are removed?		
8. Can the existing safeguards be improved?		