

Billco Manufacturing, Inc.

Manufactured Equipment

Safety Manual

YOUR BILLCO W.O. NUMBER IS:

WO _____

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1.0 INTRODUCTION

It is the policy of Billco Manufacturing, Incorporated, to the best of our ability, to meet or go beyond the rules set forth by the various agencies for the protection and well being of the personnel working on or around our equipment. However, this policy is of no value unless everyone makes a total commitment to act within the guidelines of safety.

The history of accident investigation shows that most accidents are caused by unsafe behavior rather than unsafe conditions. Therefore, in order to protect you and your fellow workers from harm, observance of the safety rules and procedures associated with plant operations is necessary.

A safe work environment cannot be achieved without the safe working habits of all employees. It is, therefore, your obligation to not only ensure that every employee is properly trained, but that he/she understands and employs safe work practices on every job at all times.

Liability Statement

Billco Manufacturing, Incorporated cannot accept liability for injury to personnel or for damage to the machine or equipment when its use is not in compliance with the operation and maintenance instructions. The user is responsible for proper operation and maintenance of the machine or equipment. The machine or equipment should only be operated by qualified personnel.

2.0 HAZARDOUS NOTICES

In addition to meeting the expressed safety requirements of a customer, the following safety notice applications are standard.

2.1 Machine Hazard Notices

Hazard notices are posted on the machine for indicating points of personnel hazards that are not readily apparent, such as pinch points, high temperature points, arc flash, and shock hazards.

Never remove warnings or instruction tags from machine. The original tags attached to the machine should remain attached throughout the life of the machine.

2.2 Instruction Manual Notices

Safety warning notices are integrated into relevant places within the text where a personnel hazardous condition could exist. Additionally, caution notices are included where an inadvertent use or procedure could result in damaging the equipment. Notes provide additional information on a subject matter, but adherence to their contents are not essential to equipment operation or safety.

3.0 MACHINE LOCKOUT

If a potentially hazardous energy source has an energy control device that is capable of being locked out, a lock-out device and a tag must be utilized. The tag must be attached at the same location as the lock-out device, to explain the purpose of the lock-out.

3.1 General Lockout/Tagout Information

NOTE: The following information is not meant as a replacement procedure for your plant safety plan concerning lockout/tagout of equipment and machinery. Rather, this information is provided as supplemental safety precautions and a reminder that safety lockout/tagout procedures must be used with Billco equipment and machinery.

Serious injury can be caused by sudden and unexpected startup of the machinery or equipment, as a result of the unexpected release of stored energy. Equipment that is shut down may inadvertently be re-started or re-energized by a co-worker, or equipment that was thought to be shut down but may be controlled by automatic processors, timers, or computers and may re-start automatically and without warning.

An employee performing the work must place a lock and tag at any point where the equipment can be turned ON or where any stored

energy can be released. This keeps the equipment from being turned ON during repairs or maintenance. When working on equipment, never depend on anyone else but yourself to perform safety lockout and tag.

3.2 Lockout/Tagout Definitions

To help understand lockout/tagout and the requirements of the OSHA Standard, the following are some basic definitions:

Affected Employee: An employee that operates or uses a machine or equipment on which service or maintenance is being performed under lockout/tagout, or whose job requires work in an area in which such service or maintenance is being performed. Affected employees must be informed when lockout/tagout is being performed.

Authorized Employee: An employee who locks out or tags out machines or equipment in order to perform service or maintenance on that machine or equipment.

Bleed: Releasing stored hydraulic or pneumatic energy.

Block-out: Physically preventing the movement of machinery or equipment. These can be electrical, pneumatic/hydraulic, process fluids and gases and mechanical.

Energized: Connected to an energy source or containing residual or stored energy.

Energy: All sources of power to a given piece of machinery or equipment. These can be electrical, pneumatic/hydraulic, mechanical, and process fluids and gases.

Energy Control: The use of energy isolating devices to block or isolate energy sources. This includes lockout/tagout procedures to prevent unexpected start-up and release of stored energy during maintenance or installation.

Energy Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including a manually operated electrical circuit breaker, a disconnect switch, a line valve, a pneumatic lockout, a block, and any similar device used to block or isolate energy.

Energy Source: Any source of electrical, pneumatic, hydraulic, mechanical, thermal, chemical, or other energy.

Isolation Points: Energy source points on equipment, such as breaker panels, switches, and valves.

Lockout: The process used to identify, cut off, and secure all energy sources before beginning repairs, adjustments or maintenance. A lockout device is used to secure equipment or machinery in the off position, ensuring that the equipment or machinery cannot be operated.

Lockout Device: A lock (either key or combination type) that holds an energy isolating device in a safe position and prevents the energizing of a machine or equipment.

Servicing and/or Maintenance: Workplace activities that require lockout/tagout on the equipment before beginning the activity because employees may be exposed to the unexpected energization or startup of the equipment or the release of hazardous energy. Servicing and/or maintenance includes construction, installing, setting up, adjusting, inspection, modifying, lubrication, cleaning, unjamming, and making tool changes.

Tagout: Attaching a tag to the lock on the power source that has been shut off, indicating the time, reason for the lockout and the name of the person doing the work. The tag acts as a warning not to restore energy to the equipment or machinery.

Tagout Device: A prominent warning tag and 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.

3.3 Energy Sources

It is important to identify the energy sources that provide power for machinery or equipment that is going to be serviced.

Energy refers to the movement (kinetic) or possibility of movement (potential) in equipment or machinery. Whether the power switch is on or off, energy is always present in any powered equipment.

Kinetic (Moving) Energy: The force caused by the motion of an object.

Potential (Stored) Energy: The force stored in an object that is not moving.

An example of kinetic energy is the energy released by a spinning shaft as it turns. An example of potential energy is a suspended load. The load is not moving, but it is under tension, which results in energy being stored.

It is important to identify and isolate both types of energy. Equipment needs to be both shut off and prevented from releasing stored energy.

If the energy source is not isolated, a release of energy can occur. This could cause unexpected start-up and movement caused by the release of stored energy, resulting in serious injury or death.

3.4 Engineering Safety Devices

Accidental start-up and/or release of stored energy can usually be controlled with engineering safety devices. Some examples of safety devices are:

- Machine guards.
- Electrical disconnects.
- Pneumatic lockout.
- Mechanical stops.
- Point-of-operation guards.

These devices are designed to provide additional safety when working on a machine or equipment, in addition to power shut-off.

However, no safety device is 100% safe if someone wants to bypass it. As a result, never rely totally on engineering safety devices as the only protection.

Lockout/tagout must be performed in the following situations:

- Whenever service or maintenance is being performed on or around any machine where injury could result from unexpected start-up or the release of stored energy.
- Whenever a machine or equipment is being installed.
- When a guard or other safety device must be bypassed or removed.
- When an employee must place any part of his/her body where it could be caught by moving machinery.

3.5 Lockout/Tagout Procedures

The following procedures are required for effective lockout/tagout:

Step 1: Preparation and Notification

Before servicing or installing a machine or equipment, the following questions must be satisfied:

- What is the type of energy source on the machine or equipment?
- What are the potential hazards related to the energy source?
- What steps are necessary to control the energy source?
- Who needs to be notified that the machine or equipment will be shutdown for service?

Once these questions have been answered, notify all affected employees that a lockout procedure is about to begin and that the machine or equipment will be shut down for service.

Step 2: Shutdown The Machine or Equipment

Follow the company's safety procedures and/or the manufacturer's instructions. Be aware that some machines or equipment have special shutdown procedures (for example, CNC machine).

Make sure all energy sources have been located and shutdown. (Some machines or equipment have more than one power source—all must be shut down.)

Step 3: Isolate The Machine or Equipment

A machine or equipment can be isolated by:

- Shutting OFF the main breaker or control switch.
- Closing valves and pneumatic lockouts.
- Disconnecting process lines.
- Pulling plugs.

NOTE: Refer to the wiring diagram to locate all isolation points, including breaker panels, switches, valves, etc.

WARNING: The following should be kept in mind when working with electricity:

- Never pull an electrical breaker switch while it is under load.
- Never remove a fuse instead of disconnecting.
- If working on electrical components, always use a voltage indicator or meter to test all exposed components for voltage before starting any work. Make sure the measuring device is rated for the testing being performed. Take into account peak voltages, line-to-line voltages (multi-phase), etc when determining ratings.
- Be aware of neutral and ground line currents from unbalanced load conditions. An open neutral or ground line can have a lethal potential difference at the break.
- Additionally, metallic plumbing (water, etc.) can also have return ground currents present which will result in a potential difference when the path is broken (e.g., plumbing line opened). Remove all voltage from equipment before working on any plumbing lines or associated equipment. Always check for potential differences between line breaks and equipment frames-to-ground points.

Step 4: Attach The Lock and Tag

Each employee who is performing maintenance is responsible for locking and tagging the machine or equipment. Each employee

whose duties require them to work on a machine or equipment must be provided with their own lock and key.

Never use another employee's lock and never loan out your own.

When all energy sources are locked, apply a tag to the power source. Make sure the tag is filled out completely and correctly.

Step 5: Release Any Stored Energy

After locking and tagging the machine or equipment, make sure that any stored energy is released. This is accomplished as follows:

- Inspect machine or equipment to make sure all parts have stopped moving.
- Bleed electrical capacitance (stored charge).
- Vent or isolate pressures such as pneumatic and hydraulic lines from the work area, leaving vent valves open.
- Use pneumatic lockouts.
- Drain tanks and valves.
- Release the tension on springs or blocking the movement of spring-driven parts.
- Block or brace parts that could fall because of gravity.
- Block, clamp, or chain any switches or levers that could be moved into the start position.
- Clear lines containing process materials that are toxic, hot, cold, corrosive, or asphyxiating.
- Monitor the process to make sure that the work will not result in an accumulation of stored energy.

Step 6: Test Machine or Equipment To Verify That All Energy Has Been Released or Controlled

To make sure that all kinetic and stored energy has been released or controlled, perform the following:

- Clear personnel from danger areas.
- Test the start switches on the machine or equipment to confirm that all power sources have been shut down and switches cannot be moved to the ON or start position.
- Check pressure gauges to make sure that all lines are de-pressurized and stored energy has been released.
- Secure all blocks, clamps, chains, and cribs.
- Check electrical circuits to make sure that voltage is at zero.
- Secure tanks (used to block feed chemicals) and make sure they are not leaking.

Because some machines can be remotely controlled, consider a machine to be energized and in motion at all times except when it has been personally locked out of operation and tested to verify that the energy state is zero.

Once it is confirmed that all energy sources have been controlled and locks and tags are in place, it is safe to begin the maintenance work. While working, avoid any actions that could re-activate the equipment. When installing new piping or wiring, make sure the lockout is not bypassed.

3.6 Safe Startup Procedures

Once the maintenance or installation is completed, the machine or equipment can be re-started. These are the procedures to follow for safe startup:

Step 1: Preparing For Startup

All machine or equipment components must be fully assembled and operational.

- Make sure all machine or equipment components are fully assembled and operational. Check all around machine for looseness of parts. Tighten, as needed, all fasteners, electrical terminals, setscrews, etc. These checks should also be performed at least every 40 hours or as frequently as equipment use and experience dictates.
- Make sure all safety guards are in place.
- Remove all tools from a machine and the work area.
- Remove all braces, pins, blocks, cribs, and chains.
- Reconnect all pressure tubing, pipes, and hoses and close all valves.
- Clear the work area of all personnel.

Step 2: Remove Lockout Devices and Tags

Except in emergencies, each lockout device must be removed by the employee who put in on.

Step 3: Notify Affected Employees

Notify all personnel in the area that maintenance, servicing or installation is complete, lockout/tagout has been removed and the machine or equipment is ready to be re-started.

Once all three steps are completed, it is safe to start up the machine or equipment.

3.7 Lockout and Tagout Devices

Lockout Devices:

- Must be provided to each employee.
- Must only be used for the purposes of lockout/tagout.
- Must be able to withstand the environment that they are exposed to for as long as they are in place.
- Must be standardized by color, shape, and size.

Tagout Devices:

- Must be standardized by color, shape, size, and format or print.
- Must contain warnings such as “DANGER - DO NOT OPERATE THIS MACHINE”.
- Must have space for the name of lock or tag owner, date, and purpose of the lockout/tagout.

Tagout Only

A tagout system can be used instead of a lockout system in the following situations only:

- When an energy isolating device cannot be locked out.
- When the employer can prove that a tagout system provides the same amount of protection as a lockout system.

3.8 Special Situations

Some situations may occur in the workplace that requires additional procedures to perform safe lockout/tagout.

Removing someone else's lock: A lock may be removed by someone other than the employee who placed the lock only under the following conditions:

- The employee whose lock is to be removed is not available to remove the lock after servicing has been completed.
- All reasonable efforts have been made to contact the employee to inform that the lock has been removed.
- The employee is contacted and informed that the lock is removed prior to the employee starting work on the next work shift.

Shift Changes: If maintenance on a machine or equipment will extend beyond one shift, provisions must be made to have employees from the new shift place their locks on the lockout device before they begin work. This must be done without any interruption in lockout/tagout protection.

Outside Contractors: If outside contractors will be working on a machine or equipment inside the facility or workplace, provisions must be in place to inform them of facility lockout/tagout procedures. If the contractor's procedures are different from the facility, an agreement must be reached with the contractor as to which procedures will be followed. All employees working on the project must be notified of any changes in their own procedures.

Temporary Re-activation: If the machine or equipment being serviced must be temporarily re-activated (for example, to test the machine or equipment as part of installation), all startup and lockout/tagout procedures must be followed.

4.0 MACHINE SAFETY RULES

When installing or using Billco's machines and equipment, the following safety practices should be observed, in addition to presently implemented plant safety procedures.

A listing of high energy (kinetic and potential) equipment that may be associated with, or a part of your machine, follows. This listing should not be considered inclusive of all high energy equipment items that may presently exist on, or provided in the future for your Billco manufactured machine or equipment.

- Conveyors
- Axis Bridges
- Clamps
- Hydraulic Units
- High Pressure Dispensers
- Pressurized Filters
- Blowers
- Screw Jacks
- Material Lifts
- Presses
- Pumps
- Moving Tables
- Heaters
- Rotary Devices

4.1 Protective Devices and Guards

Protective devices must not be defeated (e.g. door panel interlock switches, motion hold pads, emergency stop cables, etc.) to operate a machine, except where it is absolutely necessary to perform a maintenance procedure. Always read the documented maintenance procedures for the machine before attempting any

maintenance. Contact Billco Manufacturing, Incorporated if the maintenance procedure is not documented.

NOTE: Installations may require installing routing posts for emergency pull cables. These posts **must** be anchored to the floor to provide the required cable tension and stability. In this situation, be sure to follow the installation drawings and instructions provided for the site. Before actually installing the cable, check that all cable clearances are deburred to prevent snagging of the covering and cabling.

Guards are in place to protect the machine operator from moving parts. The guards are designed to prevent unintentional contact at these points on the machine. However, the operator must be aware that there can be exposed or unguarded potentially hazardous points on the machine as a necessary condition of its operation. Therefore, the operator must be made aware of all potentially dangerous points (guarded and unguarded) via training, etc. before attempting to operate the machine.

Flashing warning horns are provided on equipment or within the immediate area of movements. This warning device signals that a machine is about to become operational and that the guarded area must be clear of personnel.

4.2 Electrical Lockout

Never perform any adjustments or maintenance with the electrical service energized, unless there is absolutely no other way of doing it, and then only if there is another person present to kill the power should a problem arise. Likewise, never bypass electrical panel door lockouts to enter a "hot" panel, unless it is absolutely necessary. Again, a helper should be present to kill power, if needed. Refer to **Machine Lockout** for additional electrical lockout information.

Always replace fuses and breakers with the same size after performing corrective action. Never replace a fuse on equipment that is not locked out (see **Machine Lockout**).

4.3 Posted Warnings

Never remove posted warnings on the machine, even on a temporary basis. If a posting is attached to an assembly being removed, attach a duplicate of the original posting at the point of assembly removal.

4.4 Personnel Considerations

Qualified service personnel must be aware that a hazardous condition exists when an equipment cabinet or enclosure is opened for troubleshooting analysis and maintenance work. Personnel should follow appropriate work practices and wear appropriate personal protective equipment (PPE) for this specific hazard (e.g., electrical shock/arc flash, etc.).

WARNING: Non-qualified personnel must not open energized equipment cabinets or enclosures, or be within a predetermined hazardous area (marked or guarded area) of opened energized equipment cabinets or enclosures.

Safety glasses with side shields are always required when operating or performing maintenance on Billco machines. Since most Billco machines use chain driven material conveyors, long hair, jewelry, or loose clothing (e.g., ties) can be entangled in the drive. Tie back long hair and secure with a hat. Remove loose clothing and jewelry.

Refer to the **Glass Handling Safety Rules** for additional personnel considerations.

NOTE: The operator should always be aware of the location of safety emergency-stop pushbuttons and emergency cables on the machine.

4.4.1 Conveyor Safety Warning

Conveyors should never be manually loaded or unloaded while running. Specifically, a Billco conveyor should never be loaded or unloaded from the side. However, there is an exception: A conveyor that is specifically designed to be manually loaded or unloaded from either end while running has an un-driven outside end roll. Never reach beyond the un-driven roll. If the first or last conveyor rolls are driven, the conveyor was designed by Billco for in-line application and must not be the point of manual loading or unloading. To prevent possible personnel injury, it is the customer's responsibility to control or restrict access to all conveyor areas so as to meet the requirements of this safety statement.

Be aware that all other conveyor rolls are driven and can cause severe injury. Additionally, personnel must never lean against, reach over, crawl under or hold onto conveyor rolls, whether they are running or not running, as serious injury can result. A conveyor can start up unexpectedly during a production line sequence.

4.4.2 Moving Devices Safety Warning

In addition to the conveyor safety considerations above, never reach across any running or moving devices, assemblies or parts.

Safety labels are located in areas where servicing by qualified personnel may be required. The operator should not enter any such designated servicing areas as hazardous conditions may be present with energized electrical devices, including pneumatic and/or hydraulic devices (although electrical power may be locked out). Thus, to be sure of safe conditions, disconnect plant power,

remove plant air supply, and shutdown hydraulics. Then purge all lines and devices (pneumatic and hydraulic).

4.5 Area Housekeeping and Startup

Keep the area on and around the machine clean. Before operating the machine, check that nothing is blocking moving devices. Be sure process material is properly positioned and auxiliary equipment is in their initial start up state.

After performing maintenance on a machine, check that all tools are removed from the area and accounted for. Perform an on-line test to be sure machine is safe and operational before turning it over to production use.

WARNING: Be aware that glass chips may be present on and around the machine. Therefore, it is not recommended to use compressed air to clean the area. Only use compressed air for cleaning where specifically designated by the instruction manual.

4.6 Machine or Equipment Installation

Only move a machine as recommended in installation drawings, equipment tags, or instruction manual. If not sure on how to move a machine to its installation site, contact Billco Manufacturing, Incorporated. When moving a machine, use safe practices for balancing the lift load and strapping. Use only certified forklift operators to provide safe movement of machine by this method.

4.7 Machine or Equipment Use/Maintenance

Never operate a machine without the proper training. Read the instruction manual to become familiar with its contents. Extreme care has been used in their preparation for accuracy and comprehensive content. **The machine should only be operated and maintained by authorized and qualified personnel.**

WARNING: Before performing maintenance on a machine, verify that the machine is locked out by visual inspection and testing. Never trust by faith that a machine is locked out.

A machine must never be left unattended while running. Shut down a machine if it is necessary to leave it unattended.

Never exceed the published limitations for the machine (e.g., glass size). The machine is quality manufactured product; do not process defective material with the machine such as chipped, cracked, or otherwise defective glass. Also, do not operate a machine with worn or defective parts or having an out-of-adjustment condition. Have maintenance immediately replace these parts or perform adjustments.

Inspect all safety devices and guards to make sure they are operational before starting up a machine. Refer to the instruction manual for periodic checks.

4.8 Supplied Maintenance Tools

Always use the supplied tools recommended for specific adjustments. These tools are designed to assist in making correct and safe machine adjustments. An out-of-adjustment machine could be dangerous. Refer to the maintenance section of the instruction manual provided with the machine for adjustment information. When uncertain of the method for performing an adjustment, contact Billco Manufacturing, Incorporated.

5.0 GLASS HANDLING SAFETY RULES

Generally, Billco manufactured machines and equipment is associated with production glass processing such as washing, scoring, conveying, etc. The very nature of glass requires extreme care in handling. Several important points in the safe handling of glass when using Billco machines and equipment follow:

1. Only handle glass if it is a function of your job or you are directed to do so in an emergency situation. Step 2 below is a required prerequisite.
2. Before handling glass, make sure that you are properly protected with safety glasses having side shields and gloves specifically designed for handling glass. This is a minimum requirement. Protective head gear, safety shoes, and clothing may also be required.
3. At all times, remove cullet from work area and discard in designated containers. Never kick cullet and observe Step 2 as a required prerequisite.
4. Before handling a glass lite, examine it for vents. Discard glass with vents in an appropriate container.
5. When handling or carrying glass, first make sure that there is enough all around clearance. Check the path, both floor and overhead, for objects or obstructions. Use help as an extra precaution.
6. Never carry glass under your arm. If you should fall, you cannot get rid of it.
7. Throw glass away from you if you should slip or fall.

8. Never try to catch glass that has started to fall.
9. Never stand at ends of a glass rack.
10. Make sure that glass on buggies, skids, racks, and pallets are properly secured before lifting or moving.
11. Make sure glass is properly positioned on conveyors before turning ON.

6.0 LASERS AND PACEMAKERS PRECAUTIONS

All Billco manufactured equipment incorporating lasers and other emission type devices (electromagnetic and magnetic) have appropriate WARNING labels attached, were required. Labeling is located as close to a point source as possible. To be sure that these devices are being safely operated, thoroughly read the applicable OSHA documents (available on the internet). The requirements for the safe use of these devices change from time-to-time which means the associated OSHA documents also change periodically to remain dated. Therefore, the information contained in this section may be outdated.

6.1 Lasers

Laser hazard classes are divided into four major hazard categories. These categories are based on a graded risk associated with biological damage to eye or skin. Categories are identified by Class I through Class IV in the order of increasing biological risk as described below. Only the Class I lasers are exempt from WARNING labeling.

WARNING: Generally (but not necessarily), when a laser is a part of a machine, Billco uses a Class I Laser (see **Class I** defined below). This class is exempt from radiation hazard controls during operation, but not during maintenance since Class I laser protective enclosures may require removal. (The enclosed laser may be a higher classification.) The laser package, itself, is labeled as to classification by the manufacturer. However, in any case, do not look directly or reflectively (e.g., via mirror) into the beam path. If you are unsure as to a laser classification, contact Billco.

6.1.1 Class I

Cannot emit laser radiation at known hazard levels which are typically continuous wave CW 0.4 mW at visible wavelengths. Users of this class are generally exempt from radiation hazard controls during operation, but not necessarily during maintenance if it is a higher class laser that is enclosed in a Class I protective container.

NOTE: Most lasers by themselves do not fall into the Class I category, but they may be incorporated in a protective container or system classified as Class I.

These lasers are classified as a "no risk" because they are **not** capable of emitting hazardous laser radiation levels under any operating and viewing conditions as long as the laser assembly is not modified or removed. No machine WARNING label is required.

6.1.2 Class II (and IIA)

Emits radiation above Class I, but cannot exceed 1 mW continuous wave at visible wavelengths. Users of this class must not view the direct or reflected beam beyond their aversion response. A WARNING label stating "do not stare into beam" must be affixed to the equipment.

Class IIA is a special subcategory that applies to "not intended for viewing" (such as scanners). This subcategory limits the emission duration to 1000 seconds.

NOTE: Both Class II and IIA are based on the premise that human aversion reaction to bright light will protect against eye and skin damage.

6.1.3 Classes III and IV

These laser classes are not used in Billco equipment.

6.2 Electromagnetic and Magnetic Fields

Linear servo-operated machines use high-strength permanent magnets and, therefore, always produce a strong magnetic field regardless of power application. It should be assumed that this field is present around the entire perimeter of the machine. If you are wearing a pacemaker or A.I.C.D., never approach closer than 12 inches to anywhere around the machine perimeter which includes bridge ends. If you are unsure as to the magnetic field strengths produced by a machine, contact Billco.

Additionally, signal communication equipment may produce electromagnetic energy that may affect a pacemaker or A.I.C.D. operation. Appropriate vendor documentation is provided with this equipment. Review all provided documentation for possible emission hazards before applying power. If you are unsure as to the presence of possible emission hazards and their possible affect on personnel, contact Billco.

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