SAFETY CONSIDERATIONS

INSTALLING AND MAINTAINING IED SYSTEMS AND EQUIPMENT

SAFETY SUMMARY

This safety manual presents precautions that are applicable to all equipment involved in an IED system at any type of facility. Precautions are included for electrical and electronics equipment, and radiation hazards. Hazards which are specific to particular equipment are referenced in the documentation for that equipment.

SAFETY PRECAUTIONS

Read this Manual and/or the Documentation provided with the equipment.

Personnel properly qualified in the application and use of life safety equipment ("qualified personnel") shall read this manual carefully before performing any actions to specify, apply, install, maintain and Perform operationally test of the IED systems, and associated products in accordance with the instructions in this manual.

This manual shall be made available to all qualified personnel who operate, test, maintain, or service the IED systems, and associated products.

It is strongly recommend that such personnel read and understand the entire manual.

DEFINITIONS

Documentation reference symbol. If the product is marked with this symbol, refer to product documentation to get more information about the product.

WARNING! A **WARNING** in the manual denotes a hazard that can cause injury or death.

Caution! A **Caution** in the manual denotes a hazard that can damage equipment.

Do not proceed beyond a WARNING or Caution notice until you have understood the hazardous conditions and have taken appropriate steps.

WARNING

WARNING: IF SAFETY PRECAUTIONS, INSTALLATION AND TESTING INSTRUCTIONS ARE NOT PERFORMED PROPERLY, CONDITIONS COULD EXIST IN WHICH THE IED SYSTEMS MAY NOT OPERATE, OR MAY OPERATE IMPROPERLY. THIS COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

Even though IED systems are complex in operation and use, their operation and maintenance are relatively safe when the proper equipment and procedures are used. Thus it is very important that only responsible, trained personnel be allowed to operate

and maintain these systems, and that they use only appropriate equipment and tools. If a person is not trained, they shall contact the IED factory for direction on how to operate and maintain an IED system.

Unauthorized personnel and equipment must be restricted from the areas of operation.

All operations should be performed carefully, methodically, and without hurrying. Greater effectiveness will be developed by increased familiarity of personnel with their assignments. During any maintenance operation, if a malfunction occurs or an incorrect indication appears, stop the operation and determine whether or not it is safe to proceed. Before performing any step in a procedure be sure that the preceding step has been properly executed, and correct results obtained.

Cleanliness and good housekeeping in all installation areas are major factors in effective accident prevention. Tools and equipment should be maintained in good working order and should always be returned to their proper storage place after usage. Cleaning agents, and other cleaning aids should be removed from the equipment areas immediately upon completing the task at hand.

GENERAL PRECAUTIONS

Changes, modifications, or additions in connection with the IED system equipment shall not be made without explicit authorization of IED.

Safety devices found on mechanical, and electrical and electronic equipment are put there for the protection of personnel and equipment. These devices must be maintained in good working order and operative at all times. Safety devices shall never be removed or bypassed unless specifically authorized by the IED factory. Where safety devices have been rendered inoperable by proper an specific authorization, adequate notices shall be posted to warn personnel of the potential hazard.

Avoid the use of flammable or toxic cleaning fluids, and the use of carbon tetrachloride is prohibited.

Maintenance of the equipment shall be at least what is specified in the IED manuals and literature, and performed only with the qualified personnel.

Whenever operation and maintenance is ongoing, personnel in the equipment areas shall have an effective communication among these areas in order to protect people if any accident occurs.

ELECTRICAL AND ELECTRONIC PRECAUTIONS

In order to reduce the hazard to operating and maintenance personnel when using electrical equipment, the various areas of activity are covered in the following paragraphs. It is important to know the equipment, the circuits, and procedures thoroughly before starting a task.

PRELIMINARY PRECAUTIONS.

Precautions which are applicable to general electrical or electronic maintenance are as follows:

a. Check yourself. Wear no article that might catch on equipment or that might act as a conductor.

b. Check the working area. The equipment area shall be clean and dry. If possible, stand on a special insulator such as a rubber mat and there should be ample working space and good lighting. Do not scatter tools about the work area.

c. Check the tools. Always use proper tools and check them for their safe condition. Use screwdrivers with plastic handles. Check test equipment periodically, and examine test leads carefully (the slightest break in insulation is dangerous).

d. Check the procedures. Study the entire procedure before taking the first step. Consult the circuit diagram frequently to obtain an understanding of what is accomplished at each step. Know what is in the equipment and how it differs from others on which you have worked.

e. Be aware that high voltages may be present across terminals that are normally low voltage, due to equipment breakdown. Be careful when measuring low voltages in equipment containing high voltage circuits.

f. Do not make resistance measurements with power on.

g. Do not work within the equipment without the presence of a person who is capable of rendering aid, and who is familiar with the procedure for emergency shutdown of the equipment.

PRECAUTIONS WHEN MEASURING POTENTIALS OVER 110 VOLTS.

Observe the following precautions when measurements must be performed on circuits with potentials over 110 volts.

a. Do not measure potentials over 110 volts without the presence or assistance of a person who is capable of rendering aid, and who is familiar with the procedure for emergency shutdown of the equipment.

b. Be sure you are not grounded when you are adjusting equipment or using measuring equipment. Stand on a rubber mat or other insulator if possible. Be sure the equipment area is clean and dry. In general, use only one hand when servicing live equipment.

c. If a test meter must be held or adjusted while voltage is applied, ground the case of the meter before starting a measurement. Do not touch the live equipment or personnel working on live equipment while holding the meter. The “common” terminal on some ac electronic voltmeters is at ground potential; never connect the “common” terminal to any point above ground potential.

d. High-voltage, high-capacitance capacitors should be discharged before servicing is started.

CAUTION! Discharging must be done carefully and judiciously. First ascertain whether there is a built-in bleeder network. If so, wait a minute or two for the capacitor to discharge through the network.

Otherwise, use an external discharge network. This is most important in the case of high voltage or high capacitance capacitors. If one terminal is connected to ground, connect the discharge network between the other terminal and ground. If neither terminal of the capacitor is grounded, connect the network across the capacitor terminals. Connecting a short circuit across the terminals is not recommended. Doing so can produce extremely high currents and a flash which can injure the eyes, vaporize metals, and cause burns.

PRECAUTIONS WHEN WORKING ON ENERGIZED EQUIPMENT.

When it is necessary to work on energized equipment, think ahead and anticipate every hazard. Never work alone on energized equipment.

Interlock switches are installed on some of the doors and panels to break the power circuits when the enclosure is entered. When it is necessary to work within such an enclosure on energized equipment, the interlock may be bypassed. Extreme caution should then be exercised, as dangerous voltages are present within the unit.

AC POWER CIRCUITS.

Equipment obtaining power from a secondary distribution system should be grounded at all times by means of a third grounding wire on the power lines. Equipment permanently wired to a secondary distribution system should also be grounded separately by connection to a grounding bus or ground rod with a sufficiently large conductor to handle the current expected if the secondary source is accidentally shorted to the equipment. The ground wire should be protected from mechanical damage and periodically inspected for good physical condition.

Personnel should never depend on a switch to remove power from equipment. If the equipment is connected to the secondary distribution system by means of a power cable, detach the cable from the receptacle before attempting any repairs of removal of chassis. If the equipment is permanently wired to the secondary distribution system, remove the main fuses or open the power switch. Attach a suitable warning tag to the switch which will warn personnel not to operate the equipment; only the person who originally attaches the warning tag should be authorized to remove it.

RESUSCITATION

Personnel working with or near high voltage should be familiar with modern methods of resuscitation. Such information and training is available from the Red Cross or local emergency response personnel, like the police and fire departments.