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U.S. ATOMIC ENERGY COMMISSION

# REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

## REGULATORY GUIDE 5.7

### CONTROL OF PERSONNEL ACCESS TO PROTECTED AREAS, VITAL AREAS, AND MATERIAL ACCESS AREAS

#### A. INTRODUCTION

Proposed amendments to the Commission regulations of 10 CFR Part 50, "Licensing of Production and Utilization Facilities," 10 CFR Part 70, "Special Nuclear Material," and 10 CFR Part 73, "Physical Protection of Special Nuclear Material," would, if adopted, require measures (1) for the protection against industrial sabotage of fuel reprocessing plants and certain facilities subject to the provisions of 10 CFR Part 70 and (2) for the protection of special nuclear material (SNM) against theft or diversion from certain licensed facilities.

One element of this protection is proper control of access of personnel to and from protected areas, vital areas, and material access areas. Searching persons and packages for firearms, explosives, and other devices which could aid in sabotage or theft of SNM is another element of physical protection.

This guide describes acceptable methods of searching personnel prior to entry into a protected area and upon exit from a material access area, and of controlling access to protected areas, vital areas, and material access areas.

#### B. DISCUSSION

The objective of controlling access to protected areas, vital areas, and material access areas is to ensure that (1) only persons authorized access to a protected area are permitted within that area and (2) that only individuals authorized access to vital equipment or special nuclear material will be allowed within vital areas or material access areas.

The objective of searching individuals prior to permitting entry into a protected area is to prevent illicit passage into the protected area of objects such as

firearms, explosives, and incendiary devices which could aid in industrial sabotage to the facility or in the theft of special nuclear material. Searching individuals and packages for concealed special nuclear material at exit points from material access areas provides a means of detecting attempted theft or diversion of special nuclear material.

Some means by which control of access can be accomplished include a key and lock system, a magnetic or electronic key-card system, an attendant guard or watchman, or a closed-circuit TV (CCTV) in conjunction with keys or key-cards. Of these means, the magnetic or electronic key-card system in conjunction with closed-circuit TV offers the greatest security with a minimum of personnel. The key-cards are much more difficult to duplicate than keys and the locks cannot be "picked." Further, the control system can "read" the key-card and record the identity of the card (to whom it was issued) and the time of entry. A closed-circuit TV system would allow visual observation of the access point without requiring an attendant guard or watchman. In fact, by use of closed-circuit TV several such access points can be maintained under observation by a single guard or watchman. Such a system would be especially useful at access points to remote or normally unoccupied vital areas or material access areas. In any case, visual observation, either directly or via CCTV, provides a positive means of assuring that only individuals authorized access to an area pass through the access point into the area.

Searching of individuals can be carried out by means of a hands-on search ("frisking"), or by means of devices which will detect the presence of weapons and explosives or SNM concealed on the individual, or by a combination of both. The search should be conducted in a manner which (1) provides assurance that firearms, explosives, and other such contraband are not being carried into the protected area and that SNM is not

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being transported out of a material access area and (2) minimizes inconvenience to the individuals being searched. The use of equipment capable of detecting weapons, explosives, or SNM is usually the preferable form of searching, since the use of detection devices avoids the personal imposition of a hands-on search.

An "airport type" weapon (metal) detector located in a passageway arranged so that all individuals entering the protected area pass through the detector provides a convenient and effective means of searching for firearms.

Devices capable of detecting dynamite, TNT, and other explosives can be used to search individuals for concealed explosives. Most explosive detectors commercially available at present are of the hand-held "sniffer" variety; hence an attendant guard or watchman must pass the detector over the individual being searched. However, it is possible to locate an explosive detector in a passageway and to use the detector in the same manner that a fixed weapon detector is used.

If a hand-held explosive detector is used, the explosive check is best made after the weapon detector has indicated that no weapon is concealed upon the individual. This procedure affords greater protection to the attendant guard or watchman on the presumption that concealed explosives offer less of an immediate danger to the guard or watchman than a concealed firearm.

One alternative approach to the hand-held explosive detector would be the location of an explosive detector within a revolving-door frame. The rather small volume of air trapped in a section of the revolving door would be sampled by the explosive detector and, as the isolation of the air volume by a revolving door section provides some concentration of vapors emitted by any explosives within that section, the effectiveness of the detector would be increased. To further increase efficiency of the explosive detector, the air in the door section might be flushed through the detector.

Searching individuals for concealed SNM upon exit from material access areas can be accomplished in a variety of ways. For example, at facilities processing plutonium or uranium-233 the search for concealed SNM can be made in an attended air lock between change rooms. At areas where only highly enriched uranium is processed, the search can be carried out by use of a doorway SNM monitor and a metal detector in conjunction with a closed-circuit TV (CCTV) system, hence a guard or watchman need not be attendant. However, whether or not the access point is attended, the use of both an SNM monitor and a metal detector would seem necessary to assure that enriched uranium, shielded or unshielded, is not being concealed. In addition, exit from any material access area should be controlled to assure that all individuals and packages

exiting from a material access area pass through the SNM check system.

It is the facility guards and watchmen who are charged with the responsibility of assuring that firearms, explosives, and other similar items or devices are not transported into the protected area and that SNM is not removed from a material access area without authorization. Hence, they should search any packages being carried into the protected area or out of a material access area. No individual should be allowed to directly hand carry any package, valise, tool box, or similar hand-carriable item into the protected area or out of a material access area. Such objects should be handed to an attendant guard or watchman who will check them and pass them into the protected area or out of the material access area. To further reduce the possibility of concealment, where feasible, bulky outer clothing such as overcoats, raincoats, greatcoats, and ski jackets should be left in a cloak room provided outside the protected area and in any case should never be taken into a material access area. The licensee may wish to use several members of the security force to check packages, coats, etc., during shift change to minimize the delay encountered in gaining access. Unattended access points into the protected area can be used, provided observation of such points is maintained by CCTV to assure that packages are not being hand carried into the protected area at that point.

Posting of a sign in a conspicuous location will inform individuals requesting access into the protected area that they will be searched, and that any packages, etc., they wish to take into the protected area will also be searched.

Although the Commission regulations do not require searching of individuals entering a material access area, observation of access points provides a convenient method of ensuring that personnel do not carry weapons, explosives, and other similar items or devices into the material access area.

In emergency situations, such as those which may require the evacuation of a material access area, the objectives of access control and search should not be allowed to compromise health and safety. Hence, the licensee should develop plans of action and provide areas and equipment for searching and controlling access under emergency conditions compatible with the objectives of both safety and security. Such emergency procedures will minimize the effectiveness of an emergency situation deliberately perpetrated to conceal theft of SNM.

Administrative controls, as well as physical barriers, where applicable, may be employed to gather evacuating individuals within a holding area. Such controls would serve both to verify that no one has remained in the evacuated area and to ensure that an emergency

situation will not successfully conceal an attempted theft of SNM.

### C. DEFINITIONS

For the purpose of this guide the following definitions are provided:

1. "Guard" means an armed and uniformed individual whose primary duty is the protection of materials and property to the extent that theft of SNM or sabotage of the facility could pose a threat to the common defense and security or result in a radiological hazard to public health and safety.
2. "Watchman" means an unarmed individual, not necessarily uniformed, who provides protection for materials and property in the course of performing other duties.
3. "Patrol watchman" means an arms-qualified individual whose primary duty, at least during threat or emergency situations, is the protection of material and property, and who is normally unarmed but who may be armed during emergency or threat situations. A patrol watchman may or may not be uniformed.

### D. REGULATORY POSITION

#### 1. Protected Areas

##### a. Identity and Authorization

At each access point into a protected area, an identity and access authorization check should be made in conjunction with a search for firearms and explosives. Such identity and access authorization checks should be performed by an attendant guard or watchman or by means of an electronic or magnetic key-card system and a closed-circuit TV system. Packages should be taken into the protected area only at access points attended by a guard or watchman. If the access point is unattended, the individual monitoring the access point via closed-circuit TV should carefully observe any individual requesting access at that point to ensure that no packages are being carried into the protected area.

##### b. Personnel Search

If the search of individuals is to be carried out by means of detection equipment, a weapon (metal) detector and an explosive detector should be used. An acceptable arrangement for the use of detection equipment in a secure access passageway is illustrated in Figure 1. The doors on the secure access passageway should be interlocked so that both cannot be simultaneously open, thus providing positive access control. An explicit enabling act should be required of a security individual, either attending the secure access passageway or in the central alarm station, to open the inner door.

##### c. Metal Detector

The metal detector located within the secure access passageway should be capable of detecting a

minimum of 200 grams of non-ferrous metal placed anywhere on the body at a 90% confidence limit. The false alarm rate should be a maximum of 1%.

##### d. Explosive Detector

The explosive detector, as a minimum, should be capable of detecting dynamite, TNT, and similar nitrogen compounds in minimum amounts of 200 grams at a 90% confidence limit. The false alarm rate should be a maximum of 1%. If detector is hand held rather than permanently fixed to a passageway or revolving door frame, hence requiring an attendant guard or watchman, the search for explosives should be performed after the search for firearms. An acceptable arrangement is illustrated in Figure 2.

##### e. Alarm Annunciation

The alarms of the weapon detector and the explosive detector should annunciate at the location of the detectors, if attended, as well as in a central alarm station. The alarm annunciation at the location of the detectors need not be aural.

##### f. Alarm System

The alarms of the weapon (metal) detector and the explosive detector should be interfaced with the inner door lock so that, with an alarm triggered, the inner door cannot be opened from either side without a specific action by the individual manning the central alarm station acknowledging the alarm and enabling the inner door to be opened.

#### 2. Material Access Areas Containing Pu or U-233

##### a. Change Room Exit

Checking for concealed plutonium or uranium-233 at an exit point from a material access area into a protected area should be performed in an attended secure access passageway located between change rooms. An acceptable arrangement is shown in Figure 3. Unless exit is into a contiguous material access area, all individuals should exit from a material access area, other than a vault, only via the change rooms and should be required to deposit all work clothing in the inner change room, walk through the passageway, and dress in street clothing in the outer change room. The licensee should generally not allow packages to be transported out of the material access area via the change rooms. Showers, except those used exclusively for health physics, should be located in the outer change room. A guard or watchman need not be attendant except when personnel are exiting from the material access area.

##### b. SNM Detector

An SNM detector should be located within the passageway. The detector should be capable of detecting 0.5 gram of plutonium or 1 gram of uranium-233 shielded by 3 mm of brass concealed anywhere on an individual at a 90% confidence limit. The false alarm rate on the detector should be less than 0.1%.

**c. Door Interlock**

The doors of the attended secure access passageway should be interlocked so that both cannot be simultaneously open. The doors should also be alarmed so that an explicit action must be taken by either the attendant security individual or the individual manning the central alarm station to enable either door to open without triggering the alarm.

**d. Packages**

All packages, including waste barrels and work clothes hampers, being transported out of a material access area should be checked by an attendant guard or watchman for concealed SNM, preferably at an exit point expressly provided for packages. SNM packages should be checked for proper seals, identification, and transfer documentation.

**e. Change Room Access**

Access by personnel into a material access area should be permitted only through the change rooms. Control of access should be accomplished either by a guard or watchman attending the secure access passageway between the change rooms, or by a combination of key-card and CCTV when the passageway is unattended.

**f. Observation of Individuals**

Procedures should be employed in the control of access to material access areas to ensure that no lone individual is allowed within a material access area without some means to observe that individual's activities.

**3. Material Access Areas Containing Highly Enriched Uranium, and Vaults Containing SNM**

**a. Exit**

At material access area exit points, the check for concealed SNM should be carried out by means of an SNM doorway monitor and a metal detector. A secure access passageway located at the exit point from the material access area should house the detection equipment. An attendant guard or watchman or a closed-circuit TV connected to the central alarm station should also be provided. Administrative procedures should require the passage of packages only through attended exit points. The doors of the secure access passageway should be interlocked so that both cannot be simultaneously open. A suggested layout is illustrated in Figure 4.

**b. SNM Detector**

The SNM doorway monitor in the secure access passageway should be capable of detecting a minimum of 3 grams uranium enriched to 90% in the uranium-235 isotope in 3 mm of brass concealed anywhere on an individual at a 50% confidence limit. The false alarm rate should not exceed 0.1%.

**c. Metal Detector**

The metal detector in the secure access passageway should be capable of detecting a minimum of 100 grams of non-ferrous metal (shielding) at a 90% confidence limit concealed anywhere on an individual. The false alarm rate should not exceed 0.1%.

**d. Alarms**

The doors of the secure access passageway should be alarmed and interfaced with the doorway monitor such that an individual can be detained for a sufficient time for the doorway monitor to operate. If an individual passes through without waiting for the proper period of time (perhaps indicated by a light) the alarm should sound. The doorway monitor and metal detector alarms and the door alarms should annunciate in the central alarm station and may also annunciate at the passageway.

**e. Access**

The exit points from the material access area should be used for access points as well. Control of access should be by either the attendant security individual or by a key-card CCTV system.

**f. Closed-Circuit TV Observation**

If observation of the passageway is accomplished by CCTV, the guard or watchman monitoring the passageway should carefully observe any individual within to ensure that no packages are being carried into or out of the access area.

**g. Observation of Individuals**

Procedures should be employed in the control of access to material access areas to ensure that no lone individual is allowed within a material access area without some means to observe that individual's activities.

**h. Vaults**

A key-card CCTV system should be employed to control access to and from a vault if such access and exit points do not open to or from material access areas contiguous to the vault. In addition, all individuals who transport SNM between material access areas or to or from a vault, should be escorted by a member of the facility's security force during any period of the transport that the SNM is not within a material access area.

**4. Vital Areas**

Control of access into vital areas should be accomplished either by an attendant guard or watchman, or by means of magnetic or electronic key-card access in conjunction with closed-circuit TV. The identification check should include either direct observation by an attendant guard or watchman or observation by CCTV of each individual passing into the vital area, or some alternate means (e.g., an escort) which will provide

positive assurance that only individuals authorized access to the vital area are permitted to pass into that area.

#### 5. Security Force Response to an Alarm

The guards and patrol watchmen should be trained and prepared to protect the facility from sabotage and the SNM within from theft.

##### a. Protected Area Access Point

Upon annunciation of an alarm from explosive or weapon detection equipment located at a protected area access point attended by a lone guard or watchman, a guard should be dispatched immediately to the access point originating the alarm. If the access point is unattended, two guards should be sent to the access point. At the access point the guard or watchman should request that the individual's pockets be emptied and that the individual pass again through the detection equipment. If the individual complies and if the alarms do not register, the individual may be allowed to pass into the protected area after the contents of the individual's pockets have been examined verifying that no attempt has been made to pass explosives or firearms into the protected area. If, however, an alarm continues to register, the individual should be physically searched by an *unarmed* security individual, while at least one guard or armed patrol watchman observes, to verify that no firearms or explosives are yet concealed by the individual. If the individual refuses to comply with the request for further searching, or if a weapon or explosives are found, the individual should be denied access.

##### b. Material Access Area Exit Point

If an SNM or metal detector alarm or a door alarm is triggered at a material access area exit point attended by a guard or watchman or at an unattended exit point, security personnel, at least one of whom is armed (a guard or armed patrol watchman), should be dispatched to that exit point. The individual should be searched by emptying pockets and passing again through the detection equipment or by a hands-on search performed by an *unarmed* security individual while at least one guard or armed patrol watchman observes. The cause of the alarm should be determined before the individual is released. If the cause of the alarm was an object, metal or SNM, not concealed by the individual, the individual should be searched without the object to ensure that the object is not a decoy and that SNM is not still being concealed by the individual. If the security personnel determine that attempted *unauthorized removal* of SNM has been made with the intent to steal SNM, local police and the Federal Bureau of Investigation should be contacted, and the individual should be held by the security personnel until the local police arrive and arrest the individual.

#### c. Unoccupied Vital Areas and Material Access Areas

If unauthorized entry is made or attempted into a vital area or material access area, or if an intrusion alarm protecting an unoccupied vital or material access area is triggered, two armed security personnel should be dispatched immediately to the area of alarm. If, however, the area of the alarm can be observed by CCTV, the guard or watchman in the alarm station where the TV monitor is located should first verify the existence of intrusion and assess the extent of a threat, if any, before dispatching the security personnel. If the existence of an intrusion is verified, either by CCTV or security personnel in the area, a law enforcement authority should be notified immediately. If possible, the intruder(s) found by the security personnel should be searched and detained until arrest by local police.

#### 6. Emergency Procedures

The licensee should provide procedures and equipment to maintain the level of access control and SNM and facility protection during conditions of emergency or equipment failure. Emergency procedures should be developed and executed in a manner consistent with safety.

##### a. Evacuation Procedures

During emergency conditions which require evacuation of part or all of the facility, temporary SNM checking stations should be established at the perimeter of the protected area or at a personnel collection area outside the protected area. All individuals should be searched for concealed SNM before being released from the protected area or collection area. In addition, a roll of all individuals who had entered the evacuated area should be taken to ensure that all have evacuated safely. If an evacuation or other emergency alarm sounds, guards and watchmen should take position at prearranged surveillance points to ensure that:

- (1) Proper evacuation routes are being observed,
- (2) SNM is not being tossed over the protected area perimeter barrier, and
- (3) No one attempts to gain unauthorized access to the protected area during the emergency.

##### b. Failed Detection Equipment

Failed detection equipment should be repaired as quickly as possible. In the interim, alternate access or exit points or hand-held detection devices or hands-on search procedures should be employed. In no case should the failure of equipment be allowed to compromise the protection of the facility or the SNM within the facility.

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##### b. Material Access Area Exit Point

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# PROTECTED AREA

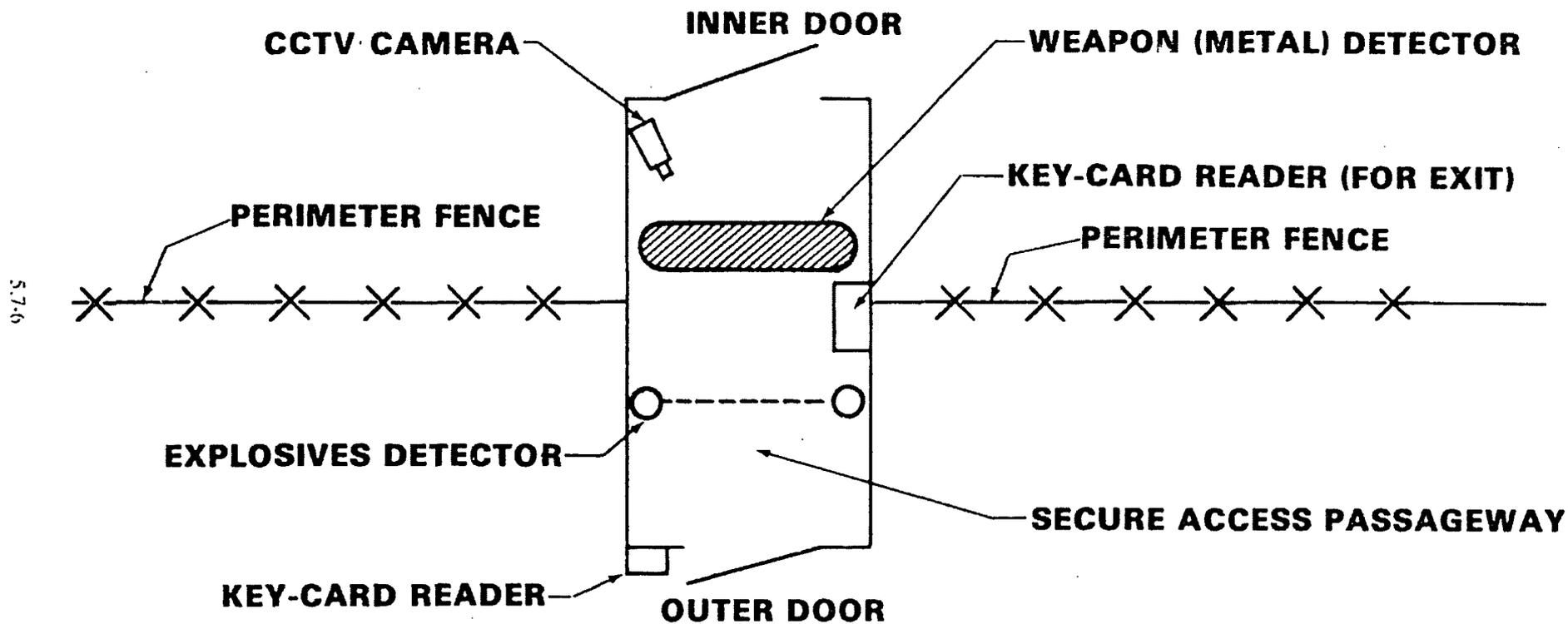


Figure 1

SECURE ACCESS PASSAGEWAY INTO PROTECTED AREA (UNATTENDED)

# PROTECTED AREA

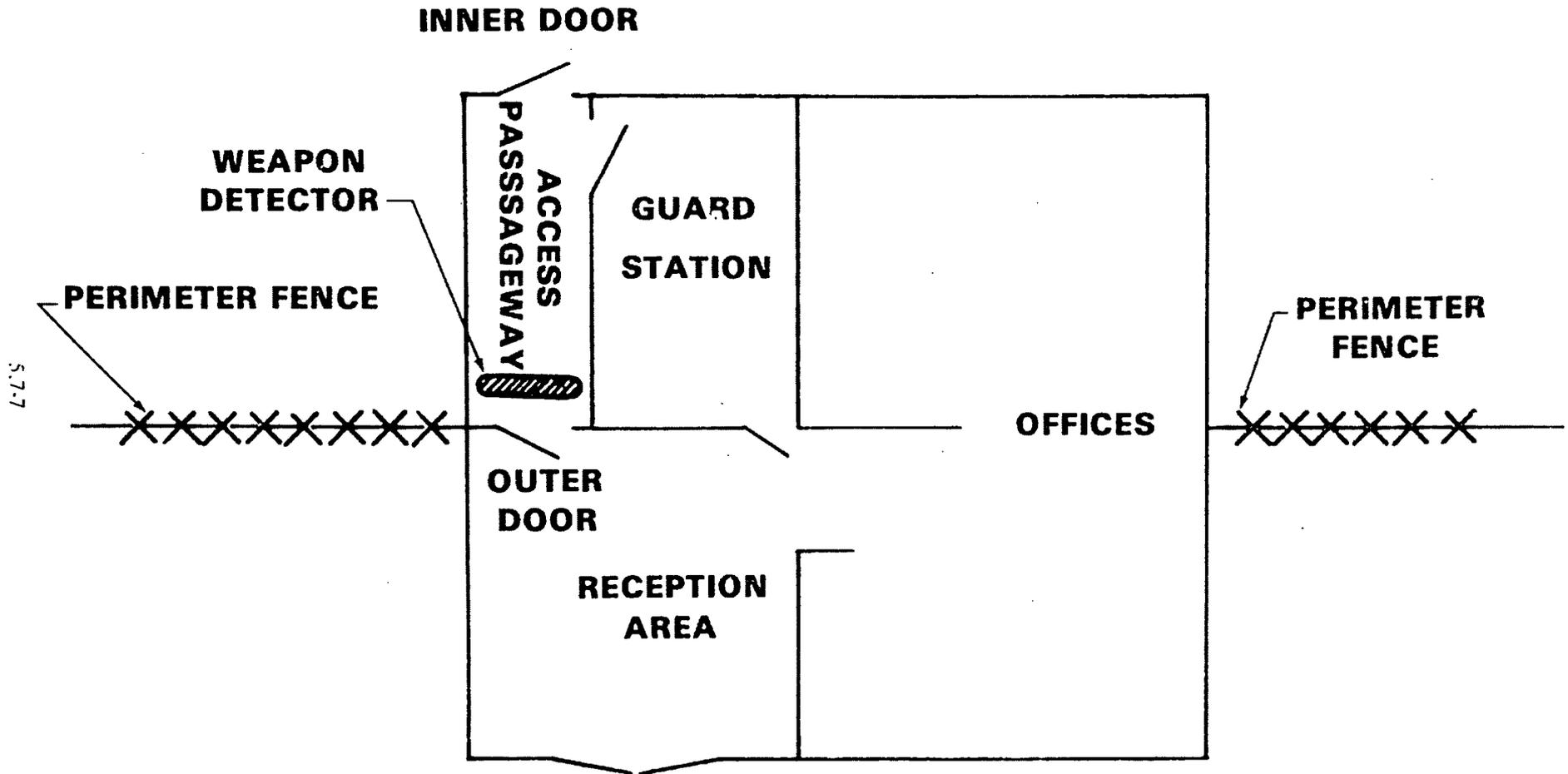
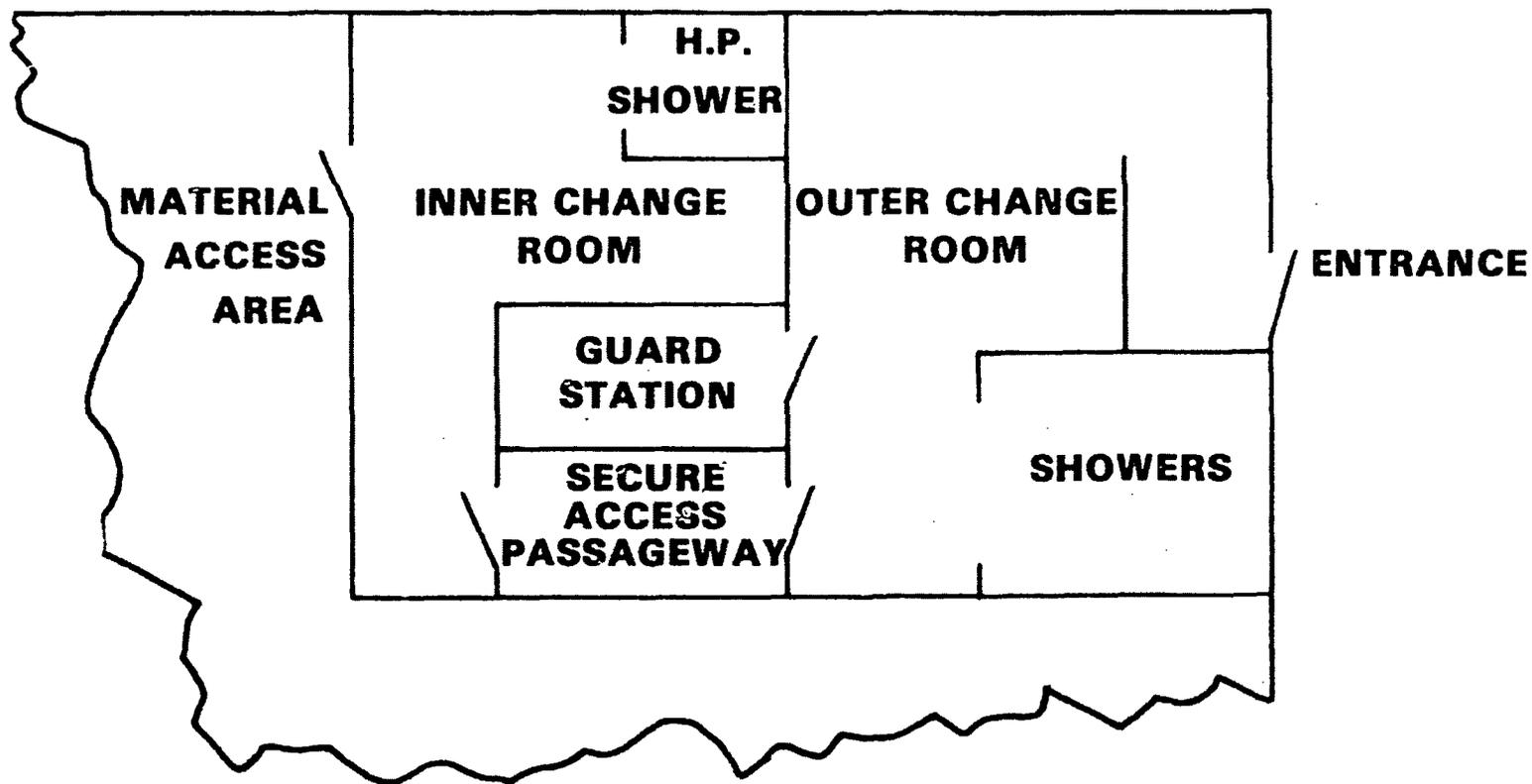


Figure 2

SECURE ACCESS PASSAGEWAY AT ENTRANCE TO PROTECTED AREA (ATTENDED)

# PROTECTED AREA

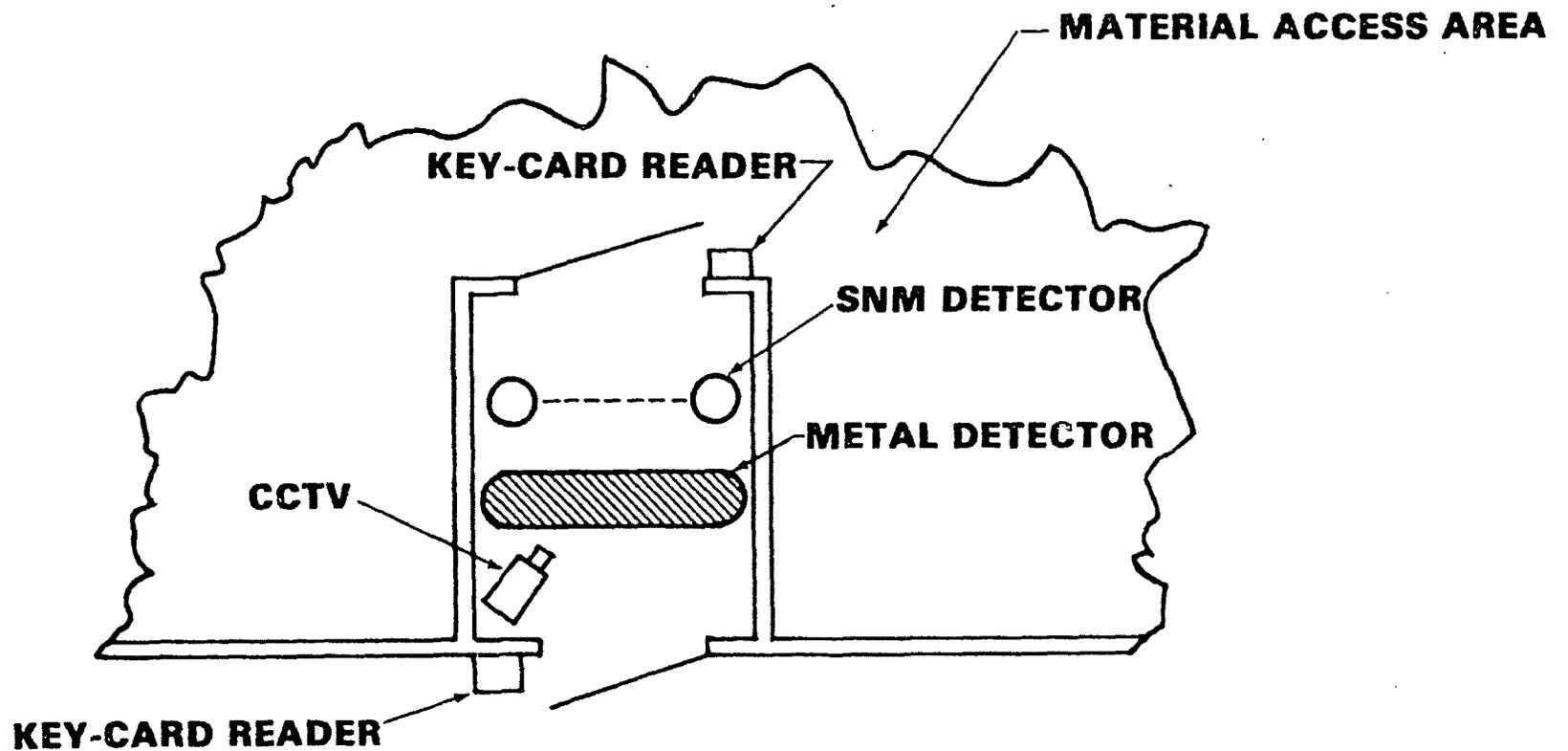


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**Figure 3**

**SECURE ACCESS PASSAGEWAY BETWEEN CHANGE ROOMS**

# PROTECTED AREA



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**Figure 4**  
**SECURE ACCESS PASSAGEWAY AT EXIT FROM MATERIAL ACCESS AREA**