NUREG-0509

Bibliography of Technical Guidance for the Physical Protection Upgrade Rule Requirements for Fixed Sites

Upgrade Rule Guidance Working Group
L. J. Evans, Jr., Chairman
T. Allen, Vice Chairman

Office of Nuclear Material Safety and Safeguards

Office of Standards Development

U.S. Nuclear Regulatory Commission

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Office of Standards Development
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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ACKNOWLEDGMENT

A Working Group was established within the Office of Nuclear Material Safety and Safeguards (NMSS), U.S. Nuclear Regulatory Commission, in July 1978 to develop a guidance package for licensees to support the issuance of the Physical Protection Upgrade Rule effective March 25, 1980. That effort has culminated in the publication of NUREG-0669, "The Fixed Site Physical Protection Upgrade Rule Guidance Compendium," of which this document is a part.

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Upgrade Rule Guidance Working Group

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Office of Standards Development, Division of Siting, Health, and Safeguards Standards, Safeguards Standards Branch, under the leadership of Mr. Ralph J. Jones, and subsequently, Dr. Willard B. Brown

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INTRODUCTION

This document is a catalog of technical references that provide useful information for determining what design features, equipment, procedures, etc., are available to be used in designing physical protection systems for fixed sites in response to the Physical Protection Upgrade Rule. In addition to documents developed by the NRC, the catalog lists other documents that were not prepared primarily to reflect NRC policy but that can be a valuable aid in making component selection decisions and in generating procurement specifications.

Part I, "Physical Protection Components and Measures," is arranged by the name of the component or measure; a listing of these components and measures is included in the Table of Contents. Each page of Part I contains the definition of a component or measure followed by lists of NRC documents and other documents that contain a substantial discussion pertinent to the subject. These lists are arranged in descending order of subject coverage; that is, the first document listed contains more information on the subject than the second document, etc.

Part II, "General," lists all documents that were screened by the NRC staff in the course of assembling this bibliography. It is divided into two lists: "NRC Documents" and "Other Documents." The NRC documents are arranged numerically by regulatory guide or NUREG number; the other documents are arranged in alphabetical order by title.

PART I

PHYSICAL PROTECTION COMPONENTS AND MEASURES

DEFINITION

Admittance authorization criteria are criteria that specify the considerations necessary for proper control of access to specified areas or material. Admittance authorization schedules are listings of persons determined by competent management personnel to be authorized to enter specific areas or to have access to specified materials during specified time periods. These lists are authenticated by the site security manager or his designee before implementation.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

Admittance authorization and verification procedures are written instructions or explanations specifying how admittance authorization and verification are to be conducted by site personnel. These procedures specify who is responsible for admittance and for granting authorization, what kinds of authorization and verification are required for access into different areas, and what differences in authorization and verification exist for different classes of entrants, e.g employees, visitors, vehicles, or material. These procedures also specify what records must be kept to verify the use of proper admittance authorization and verification and how and by whom such records will be maintained.

NRC DOCUMENTS

R.G. 5.52, "Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material at Fixed Sites"
R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

Air and utility inlet barriers are barriers such as metal bars, wire mesh, or grates that prevent access to air and utility ducting, registers, sewers, and tunnels and thus help prevent unauthorized access to certain areas or material.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. **Physical Security Standards for Sensitive Compartmented Information Facilities**
   Defense Intelligence Agency, ATTN: DS-4C,
   Washington, D.C. 20301, DIAM 50-3, July 1974

   This report establishes standards for the protection of sensitive information. It describes methods of protection designed to prevent or detect attempted forced or surreptitious entry and a means of apprehending the intruder before he can remove the sensitive information or perform an unauthorized act.

4. Annunciation Systems

- Computer-Assisted
- Individual Alarm
- Multiplexed Alarm

DEFINITION

An annunciation system is that part of an alarm system that assesses and indicates sensor status at the central and secondary alarm stations. A computer-assisted system employs a computer to process and assess incoming signals and can perform sophisticated manipulation of the data to automate many CAS/SAS operator tasks. Individual alarm annunciators indicate the status of their particular alarm sensor at the CAS or SAS. Through a variety of means, a multiplexed alarm annunciation system indicates the status of multiple alarm sensors with a single shared output or readout. This system often includes digital zone readout and a hard-copy printer.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguards control and communication system functions and (2) evaluating existing commercial systems.

2. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

3. Johnson, Charles S.
   Bilevel Alarm Monitoring Mutiplexer
   TM Development Division 9421
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-0605, June 1977

   This report describes the operation of the Bilevel Alarm Monitoring Multiplexer used in the Adaptive Intrusion Data System (AIDS). The multiplexer can handle 48 alarm channels and format the alarms into binary formats compatible with the destination of the alarm data.

DEFINITION

Area zoning is a form of work rule design in which the facility is characterized so that individual guards or employees are restricted to performing particular functions in certain specific areas and are precluded from performing these or similar functions in other areas.

NRC DOCUMENTS

NUREG/CR-0532, "Safeguards Against Insider Collusion"

OTHER DOCUMENTS

1. J. Glancy et al.
   Analysis of Nuclear Fuel Facility Safeguards Threats Involving Insider Collusion
   Science Applications, Inc., P.O. Box 2351
   1200 Prospect St., La Jolla, CA 92037
   SAI-78-547-LJ, April 1978

   This report describes a methodology for analyzing the insider collusion threat and suggests ways to minimize that threat.

DEFINITION

Balanced magnetic switches consist of a switch unit and a magnetic unit. The switch unit containing a magnetic reed switch is mounted on the stationary part of the door or window. The magnetic unit, which contains a permanent magnet, is mounted on the movable part of the door or window. The location and biasing of the magnets are such that capture using a separate magnet is not possible.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
Magnetic Switches for Burglar Alarm Systems
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0301.00, March 1974

   This study contains performance criteria for magnetically actuated electrical switches for use in protective intrusion alarm circuits to monitor positions of doors, windows, etc.

2. Law Enforcement Assistance Administration
Mechanically Actuated Switches for Burglar Alarm Systems
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0302.00, May 1974

   This study contains performance criteria for mechanically actuated electrical switches for use in protective intrusion alarm circuits to monitor positions of doors, windows, etc.

3. Law Enforcement Assistance Administration
Mercury Switches for Burglar Alarm Systems
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0303.00, May 1974

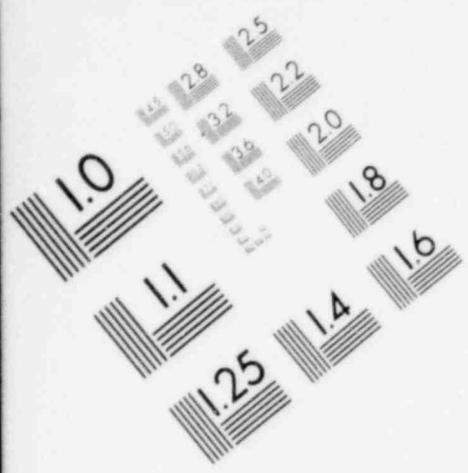
   This study contains performance requirements and test methods for mercury switches used in protective intrusion alarm circuits to monitor tilt positions of horizontally hinged doors, windows, etc.

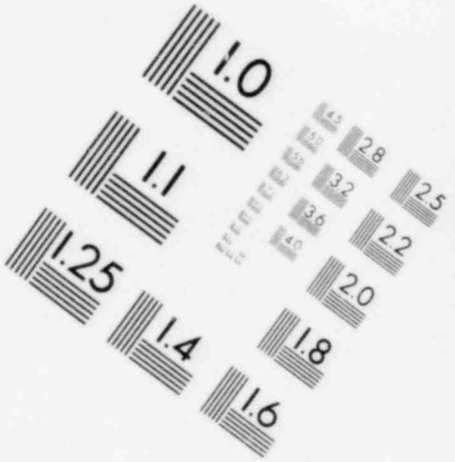
4. **Intrusion Detection Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes, and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.





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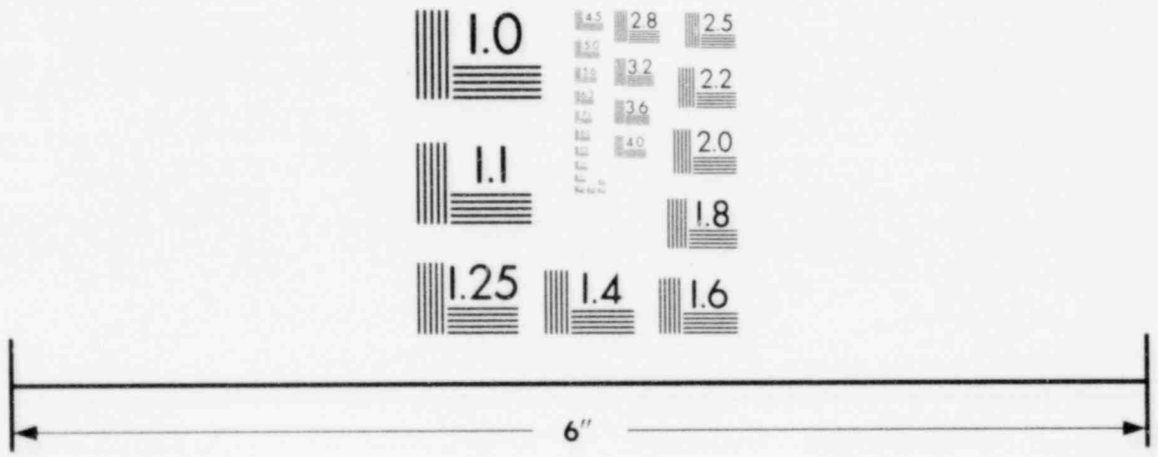
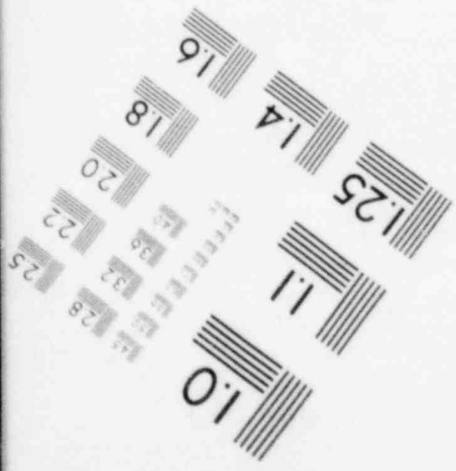
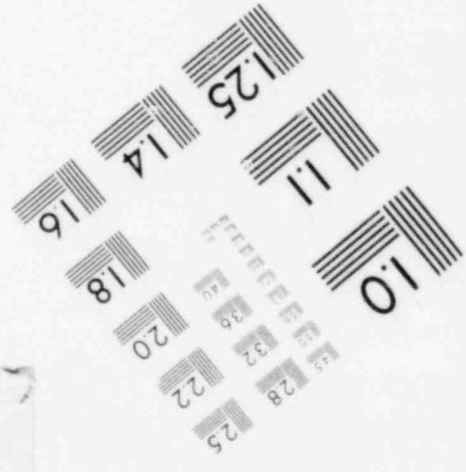
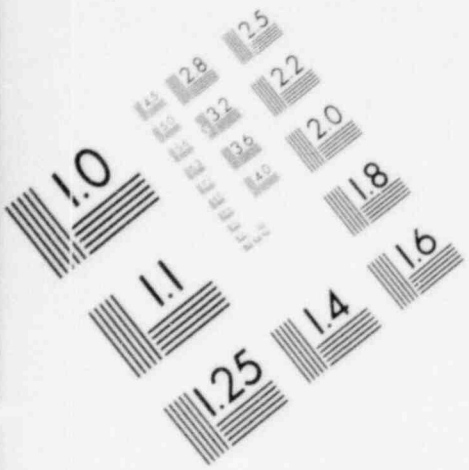








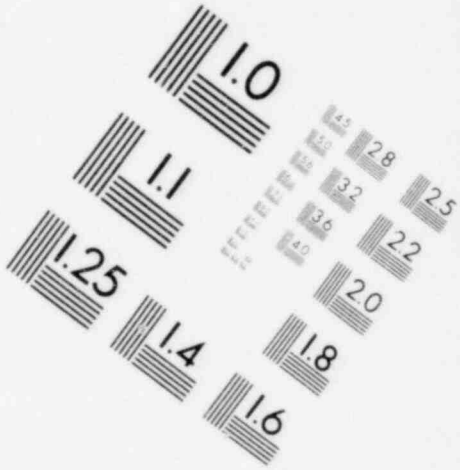
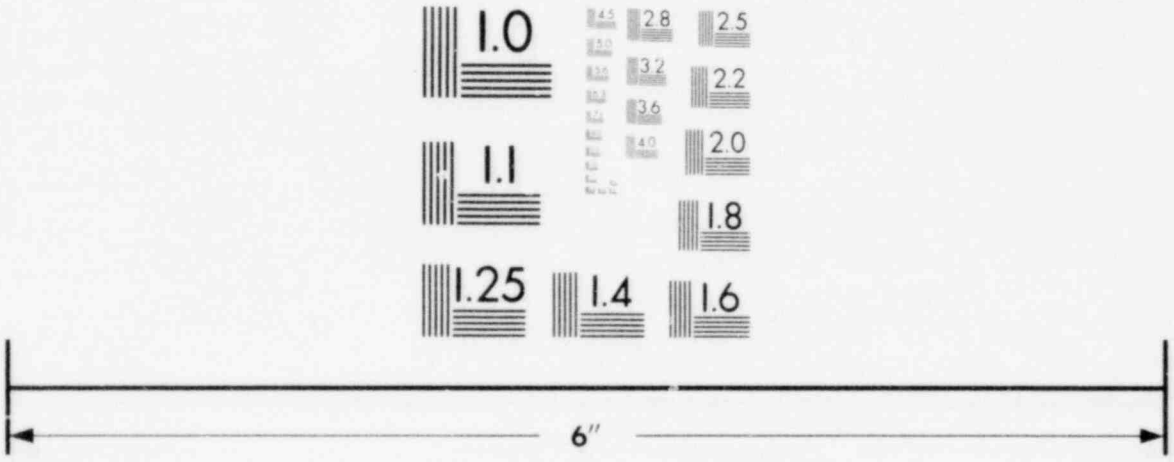
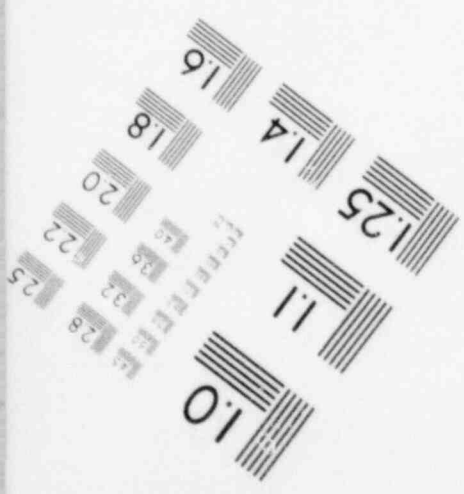
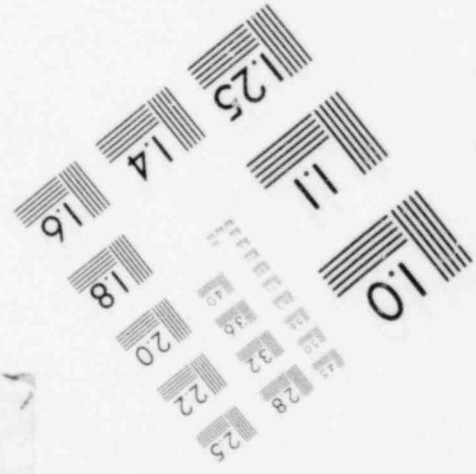


IMAGE EVALUATION TEST TARGET (MT-3)







DEFINITION

A breakwire system consists of a loop of wire or foil whose resistance is monitored by a bridge circuit. The wire may be fabricated into screens, grids, open wiring, and grooved strippings in various arrays and configurations to detect surreptitious and forcible penetrations of movable openings, doors, walls, ceilings, and skylights. Window foil is applied to glazed openings. Cutting, breaking, or grounding the breakwire will cause an alarm.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. **Selection and Application of Joint-Services Interior Intrusion Detection System (J-SIIDS)**
   U.S. Air Force HQS, Washington, D.C. 20330
   U.S. Army TB-5-6350-262, U.S. Navy NAVELEX 0967-464-9010, U.S. Air Force TO-3159-1-101
   February 1974

   This report provides guidelines for the selection of J-SIIDS components.

8. **Buried-Line Sensors**
   - **Seismic**
   - **Magnetic**
   - **Geophone String**
   - **Piezoelectric String**

DEFINITION

The buried-line seismic system may include any number of systems that rely in some manner on seismic disturbances for the detection stimulus. This would include balanced pressure sensors (BPS), buried-line intrusion detectors (BLID), buried electret cable, and buried ported coaxial cable. The buried line magnetic sensor system consists of a magnetic sensor that is sensitive to disturbances in the local magnetic field caused by nearby movement of ferromagnetic material such as iron. The buried-line geophone string system is an exterior intrusion detection device that detects movement within its range by translating ground vibrations into coil vibrations within the sensor. The buried-line piezoelectric string system is an exterior intrusion detection device that detects movement within its range by using a piezoelectric crystal, which produces an electrical impulse when stressed, as its sensor.

NRC DOCUMENTS

R.G. 5.44, "Perimeter Intrusion Alarm Systems"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. Martin, J. P.
   1973-1974 Buried Line Sensor Evaluation (U)
   Sandia Laboratories, Albuquerque, NM 87185
   RADC-TR-75-13 Vol. III, August 1975

   This report analyzes data collected in the buried line sensor evaluation of 11 sensor types during the winter. Classified Confidential National Security Information.

3. Cravens, M.N.
   Established Characteristics of Exterior Intrusion Alarm Systems (U) Confidential NSI
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0296 CNSI July 1976

   This report lists 46 exterior alarm systems for which performance data are available. Detailed characteristics and descriptions are given for ten systems that could protect facilities.

4. Chambers, O., Allen, R., Desens, A., Martin, J.
   Buried Line Sensor Evaluation for BISS (Test Plan) Part I, Line Sensors and Evaluation Philosophy
   University of Kentucky, Carnahan Conference on Crime Countermeasures Proceedings, 1974, BU No. 105, August 1974

   This is basically a test plan designed to examine the performance of selected buried line sensors falling within the seismic, magnetic, stress, and multi-phenomenological detection categories.

5. Fite, Robert A.
   Commercial Perimeter Intrusion Detection Equipment Evaluation
   Counter Intrusion Laboratory, Intrusion Detection Division, DRDME-XI, U.S. Army Mobility Equipment Research and Development Command,
   Fort Belvoir, VA 22060, 2209, May 1977

   This report evaluates commercial, outdoor, intrusion-detection systems from the viewpoints of detection value, nuisance-alarm rate, EMI, temperature, and salt-spray tests.

DEFINITION

A capacitance alarm is a system using an electronic sensor that detects changes in the capacitance between the protected object (a metal safe, cabinet, or piece of machinery) and ground.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

DEFINITION

CCTV monitoring/surveillance involves the use of closed-circuit television to monitor specified areas within a facility. Such factors as optimum screen size and viewing distance, maximum effective viewer observation time, number of screens that can be effectively monitored by one individual, and equipment specification guidelines are important considerations.

NRC DOCUMENTS

NUREG-0178, "Basic Considerations for Assembling a Closed-Circuit Television System"
R.G. 5.14, "Use of Observation (Visual Surveillance) Techniques in Material Access Areas"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. Dr. Robert Mackie
Some Human Factors that Influence Reliability of Signal Detection and Identification in Surveillance Systems
National Bureau of Standards, NBS No. 480-24
November 1977

   This paper describes some human capabilities and limitations that significantly influence the overall performance of surveillance systems.

2. Dr. Carl M. Stroh
Vigilance: The Problem of Sustained Attention
Pergamon Press Inc., Maxwell House, Fairview Park Elmsford, New York, 10523, Library of Congress Catalog Card No. 76-157656, 1971

   This book summarizes the factors influencing vigilance. Specific areas include signal and stimulus frequency, personality of test subjects, and effects of intelligence and age on subject response.

3. Law Enforcement Assistance Administration
Selection and Application Guide to Fixed Surveillance Cameras
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-Guide-0301.00, December 1974

   This report is a selection and application guide to fixed surveillance cameras primarily directed toward retail crime.

4. **Closed-Circuit Television for Airport Blind-Spot Surveillance - Equipment Selection and Establishment Guidelines**
Federal Aviation Administration, FAA 6171-1
November 1968

   This report provides a description of acceptable closed-circuit TV components which, when assembled into an operational system, should provide airport tower controllers with a means of surveillance of airport blind spots.

5. **Safeguards Control and Communications Systems Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguard control and communication system functions and (2) evaluating existing commercial systems.

DEFINITION

A CCTV system is composed of one or more cameras and lenses at the remote end, a display monitor at the local end, and various transmission, switching, and recording systems connecting cameras and displays. Auxiliary equipment may be used to provide remote control of the camera and lens system. The system may also be used as an intrusion detector sensor through the use of a video motion detector.

NRC DOCUMENTS

R.G. 5.14, "Use of Observation (Visual Surveillance) Techniques in Material Access Areas"
NUREG-0178, "Basic Considerations for Assembling a Closed Circuit Television System"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"
NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguards control and communication system functions and (2) evaluating existing commercial systems.

3. Richmond, Joseph C.
   Image Quality of Monochrome Television Cameras
   National Bureau of Standards, NBS Special Publication 480-25, 1977

   This document describes camera operating characteristics most frequently quoted by monochrome TV camera manufacturers. These characteristics are limiting resolution, signal-to-noise ratio, and sensitivity.

4. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

5. Warfel, George H.
   Automated Identification Methods
   Security Management, American Society for Industrial Security, 200 K St. NW., Washington, D.C.
   Volume 22, No. 6, June 1978

   This article summarizes the book, *Identification Technologies*. All current methods of identification are discussed and compared in the book, along with a general treatise on ID today. This summary discusses the philosophy of automated ID, mass ID, and some of the methods and devices currently on the market.

DEFINITION

The central alarm station (CAS) is the primary location for site security alarm annunciation and assessment. The secondary alarm station (SAS) provides a redundant verification capability and serves as a backup in the event of CAS failure. Both stations are to be designed and operated in accordance with the requirements of paragraph 73.46(e)(5) or approved equivalent specifications.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"
R.G. 5.52, "Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material at Fixed Sites"
NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.43, "Plant Security Force Duties"

OTHER DOCUMENTS

1. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguards control and communication system functions and (2) evaluating existing commercial systems.

DEFINITION

Close-out inspection by a third party is an inspection by a technically competent individual of equipment after maintenance. It is required that the individual not perform the work or be part of a two-man rule function for maintenance personnel.

NRC DOCUMENTS

NUREG/CR-0532, "Safeguards Against Insider Collusion"

OTHER DOCUMENTS

1. L. Kull et al.
   Protection of Nuclear Power Plants Against Sabotage by an Insider
   Science Applications, Inc., P.O. Box 2351
   1200 Prospect St., La Jolla, CA 92037
   SAI-77-868-LJ, October 1977

   This report examines the safeguards measures and procedures that provide protection against the threat of nuclear reactor sabotage by a single insider. Several combinations of specific measures are proposed that could minimize this threat.

2. El-Bassioni et al.
   Protection of Nuclear Power Plants Against Sabotage by Two Insiders
   Science Applications, Inc.
   P.O. Box 2351, 1200 Prospect St., La Jolla, CA 92037
   SAI-77-965-LJ, January 1978

   This report is a sequel to a report on a single-insider threat (SAI-77-868-LJ), in which specific safeguards were designed to protect against this threat. This report examines the effectiveness of those safeguards against the two-insider threat and recommends upgrade where vulnerabilities are found.

DEFINITION

An active electronic badge system consists of a portable electrically coded badge and a stationary interrogation unit. The interrogation unit supplies power to the badge by magnetic induction and receives and decodes the identification data from the badge. Employee action is not required to accomplish the badge reading; the badge is read automatically when the employee passes through the RF field set up by the interrogation unit.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

2. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A capacitance-coded badge consists of an array of small conducting plates laminated in the badge. The code is read from the badge by an electronic reader that measures the capacitance of the plates.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

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   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

An electric-circuit badge is a plastic-laminated badge containing a printed circuit pattern that selectively closes electrical circuits when inserted into a badge reader. The badge reader is simply a card edge connector for a printed circuit board. Entry may be granted automatically or may be manually controlled by a member of the guard force.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

2. Ellis, R. J., Mitre Corporation
   The Criminal Use of False Identification, Appendix C2, Automated Identification Technology
   United States Department of Justice, Federal Advisory Committee on False Identification, 052-003-00226-4, November 1976

   This report summarized the nature, scope, and impact of criminal use of false identification in the United States with recommendations to combat the problem. Appendix C2 deals specifically with automated techniques and equipment.

3. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
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   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A magnetic-code badge reader system uses badges on which an array of spots has been permanently magnetized. The code is determined by the polarity of the magnetized spots. The badge reader contains either magnetic sensors that are interrogated electrically or magnetic reed switches that are mechanically actuated when a magnetic spot with the proper polarity is located adjacent to the reed.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

2. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

In a magnetic-strip badge reader system, a strip of magnetic material along one edge of the badge is encoded with the badge data. The data are read as the magnetic strip is moved past a magnetic read head.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

2. Ellis, R. J., Mitre Corporation
   The Criminal Use of False Identification, Appendix C2, Automated Identification Technology
   United States Department of Justice, Federal Advisory Committee on False Identification, 052-003-00226-4, November 1976

   This report summarized the nature, scope, and impact of criminal use of false identification in the United States with recommendations to combat the problem. Appendix C2 deals specifically with automated techniques and equipment.

3. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

The metallic-strip badge uses rows of copper strips that are laminated in the badge. The presence or absence of strips in the rows determines the code pattern, which is read from the badge as it passes through an eddy-current sensor.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. Robertson, R.D.
Cain System Field Test
Lawrence Radiation Laboratory, University of California, Livermore, CA 94550, UCID-15816
February 1971

This report presents the results of field testing of an automatic access control system under controlled conditions. The system uses a computer as a central controller and individually coded badges for employee identification.

2. **Entry-Control Systems Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 77-1033, September 1977

This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

3. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

In this system, the badge contains a geometric array of spots or bars printed with ink opaque to infrared light on an insert laminated into the badge. Photodetectors in the badge reader detect the optical transmission through the array and hence the code.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

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   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

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DEFINITION

This system uses badges into which electric tuned circuits are laminated. When the badge is placed within a swept frequency RF field, resonant frequencies of the tuned circuits are detected. These resonant frequencies present unique identification codes.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

A commercial telephone system is a system that is linked with telecommunications systems external to the site and communicates voice data transmissions over commercially owned and controlled land lines and microwave links.

NRC DOCUMENTS

NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. **Physical Security Standards for Sensitive Compartmented Information Facilities**
   Defense Intelligence Agency, ATTN: DS-4C
   Washington, D.C. 20301, DIAM 50-3, July 1974

   This report establishes standards for the protection of sensitive information. It describes methods of protection designed to prevent or detect attempted forced or surreptitious entry and a means of apprehending the intruder before the intruder can remove the sensitive information or perform an unauthorized act.

2. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

Contingency plans and procedures are plans and procedures formulated to ensure proper handling of nonroutine or emergency events.

NRC DOCUMENTS

R.G. 5.52, "Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material at Fixed Sites"
NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.43, "Plant Security Force Duties"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

This type of lighting system is controlled by the security force from a remote secure location with optional capabilities to increase or decrease intensity or adjust the direction of the lighting to support CCTV.

NRC DOCUMENTS

NUREG-0178, "Basic Considerations for Assembling a Closed-Circuit Television System"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. Patrick G. Meguire, Joel J. Kramer, Addie Stewart
   Human Factors Section, Center for Consumer Product Technology, NBS
   Security Lighting for Nuclear Weapons Storage Sites: A Literature Review and Bibliography
   Intelligence and Security Directorate, Defense Nuclear Agency, Washington, D.C. 20305
   NBS Special Publication 480-27, November 1977

   This report presents a literature review and bibliography dealing with the optimization of nuclear-weapons storage-site security lighting through the application of established principles of psychological and behavioral functioning.

DEFINITION

A data link via radio frequency uses electromagnetic radiation at radio frequencies to convey data (e.g., alarm sensor output) to a control unit. It is often employed where use of hardwire is impractical or undesirable.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguard control and communication system functions and (2) evaluating existing commercial systems.

DEFINITION

A direct-line telephone intercom is an internal point-to-point telephone system used to communicate voice transmissions over dedicated land lines.

NRC DOCUMENTS

NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. **Physical Security Standards for Sensitive Compartmented Information Facilities**
   Defense Intelligence Agency, ATTN: DS-4C
   Washington, D.C. 20301, DIAM 50-3, July 1974

   This report establishes standards for the protection of sensitive information. It describes methods of protection designed to prevent or detect attempted forced or surreptitious entry, and a means of apprehending the intruder before the intruder can remove the sensitive information or perform an unauthorized act.

2. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

Direct monitoring/surveillance consist of human observation of a certain activity for the purpose of determining whether or not the activity is authorized.

NRC DOCUMENTS

R.G. 5.14, "Use of Observation (Visual Surveillance) Techniques in Material Access Areas"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. L. Kull et al.
Protection of Nuclear Power Plants Against Sabotage by an Insider
Science Applications, Inc., P.O. Box 2351
1200 Prospect St., La Jolla, CA 92037
SAI-77-868-LJ, October 1977

   This report examines the safeguards measures and procedures that provide protection against the threat of nuclear reactor sabotage by a single insider. Several combinations of specific measures that could minimize this threat are proposed.

2. Joel J. Kramer, Human Factors Section, NBS
Sponsored by Law Enforcement Standards Lab & Human Factors Section, National Bureau of Standards and the Intelligence and Security Directorate, Defense Nuclear Agency
The Role of Behavioral Science in Physical Security: Proceedings of the First Annual Symposium (April 29, 30)
NBS Special Publication 480-24, November 1977

   This paper examines the patterns behind the seemingly random acts of violence performed by terrorists. The second section of the paper reviews the changing character of terrorist operations and capabilities. A third section addresses the contributions of the behavioral and social sciences to meeting the challenge of terrorist violence.

3. El-Bassioni et al.
Protection of Nuclear Power Plants Against Sabotage by Two Insiders
Science Applications, Inc., P.O. Box 2351,
1200 Prospect St., La Jolla, CA 92037
SAI-77-965-LJ, January 1978

   This report is a sequel to a report on a single-insider threat (SAI-77-868-LJ), in which specific safeguards were designed to protect against this threat. This report examines the effectiveness of those safeguards against the two-insider threat and recommends upgrade where vulnerabilities are found.

DEFINITION

Doors and associated hardware include characteristics and specifications for doors, hinges, frames, strikes, openers and closers, bolts, and any other component used with a door that may affect the door's safeguards function.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"
NUREG/CR-1378, "Hardening Existing SSNM Storage Facilities"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. Law Enforcement Assistance Administration
   Physical Security of Door Assemblies and Components
   National Institute of Law Enforcement and Criminal Justice, NILECJ-STD-0306.00, May 1976

   This report contains established performance requirements and methods of testing for the resistance of door assemblies and components for forced entry.

3. **Standard Test Methods for Security of Swinging Annex Door Assemblies**
   American Society for Testing and Materials
   ANSI/ASTM F 476-76, 1976

   This report provides a standard method of testing swinging door assemblies. Some acceptance criteria are in Annex A-1 to the standard.

4. Squier, John L. and Gray, Kenneth O.
   Attack and Bullet Resistant Security Door Assemblies
   Naval Facilities Engineering Command and Naval Sea Systems Command, CEL-TM No. 61-78-9, July 1978

   This report discusses attack-resistant door assemblies. The discussion covers the door, frame, hinges, and locking hardware. Estimated penetration times and recommendations and conclusions are provided.

5. Underblake, L. and Warren, G.
   Evaluation of Bullet Resistant Door Configuration Physical Security R&D Program
   Western Division of the Naval Facilities Engineering Command, CEL-TM No. M-571-77-3, February 1977

   This report presents the results of tests to evaluate the ballistic resistance of a door constructed of 18GA sheet metal skin on both sides of a 3/8-inch "bullet-resistive steel" core held in place with 22GA stiffeners between the core and outer skin.

DEFINITION

A duress alarm is a device or procedure designed to covertly signal an alarm under situations of duress. It may be electrical or mechanical in nature or consist of a simple verbal code or signal.

NRC DOCUMENTS

NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Duress Sensor Study**
   U.S. Army Mobility Equipment Research and Development Center, Fort Belvoir, VA 22060, June 1975

   The report briefly reviews selected techniques that can be used in a duress sensor. The technical trade-offs of these techniques are discussed, and recommendations are made for further development and investigation of user-oriented duress sensor equipment.

2. Roehrig, Steven C.
   Automatic Duress Alarms through Physiological Response Monitoring
   Advanced System Development Division 1712
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-0191, July 1977

   This paper describes an initial study designed to determine the applicability of the basic concept of physiological-response-monitoring security programs and to provide a subjective overview of problem areas pertinent to continued monitor development.

3. Simes, J. E., and Howard, J. S.
   A Personal Alarm System for Prison Officers
   University of Kentucky, Carnahan Conference on Crime Countermeasures, 1976 Proceedings, BU No. 110, May 1976

   This paper describes work undertaken by the British Home Office Scientific Advisory Branch and a contractor (The Plessey Company) to develop a pocket-size alarm device for prison officers and others who risk attack in hostile or lonely working environments.

4. Fletcher et al.
   Silent Emergency Alarm System for Schools and The Like
   National Aeronautics and Space Administration P-11307, July 1973

   This report discusses a new improved emergency alarm system for a multichamber facility that can indicate an emergency in any of the chambers unbeknownst to those in the emergency-affected chamber.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Volum II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

An E-field fence is composed of an alternating-current field generator that excites a field wire, one or more sensing wires that couple into the resultant electric field, and an amplifier and signal processor to amplify and detect changes in the signal amplitude of the sensing wires.

NRC DOCUMENTS

R.G. 5.44, "Perimeter Intrusion Alarm Systems"
NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. Fite, Robert A.
   Commercial Perimeter Intrusion Detection Equipment Evaluation
   Counter Intrusion Laboratory, Intrusion Detection Division, DRDME-XI, U.S. Army Mobility Equipment Research and Development Command
   Fort Belvoir, VA 22060, 2209, May 1977

   This report evaluates commercial outdoor intrusion-detection systems from the viewpoints of detection value, nuisance-alarm rate, EMI, temperature, and salt-spray tests.

3. Agranoff, M. A.
   An Evaluation of Perimeter Protection Systems Available
   Security Management (September 1977) American Society for Industrial Security, 2000 K St. NW., Washington, D.C., September 1977

   This document reviews available exterior intrusion-detection systems and compares the most commonly used perimeter sensors.

4. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

An electret fence sensor is a coaxial sensing cable with a polarized dielectric and a processor. Detection is based on the fact that a small amount of stress applied to the dielectric will produce an electrical output that can be detected. A tilt switch fence system consists of several sensing switches connected in series or parallel and a processor. Motion of the switch housing will make or break switch contact causing an alarm. Switches are mounted on fence fabric or posts.

NRC DOCUMENTS

R.G. 5.44, "Perimeter Intrusion Alarm Systems"

OTHER DOCUMENTS

1. Zdyb, G. J.
Fence Sensor Evaluation (U)
Rome Air Development Command (OCDS), Air Force System Command, Griffiss Air Force Base
New York, RADC-TR-75-241, November 1975

This document reports the results of comparative tests made of eight types of fence sensors with detailed descriptions of sensor equipment, test parameters, measured performance, test results, and recommendations for improving sensor design and performance. Classified Confidential National Security Information.

2. **Intrusion Detection Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 76-0554, November 1977

This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

3. Cravens, M. N.
Established Characteristics of Exterior Intrusion Alarm Systems (U) Confidential NSI
Sandia Laboratories, Albuquerque, NM 87185
SAND 76-0296, CNSI, July 1976

This report lists 46 exterior alarm systems for which performance data are available. Detailed characteristics and descriptions are given for 10 systems that could protect facilities.

4. Griffith, Richard D.
Commercial Perimeter Intrusion Detection Equipment Evaluation
Counter Intrusion Laboratory, Intrusion Detection Division, DRDME-XI, U.S. Army Mobility Equipment Research and Development Command
Fort Belvoir, VA 22060, 2209, May 1977

This report evaluates commercial, outdoor, intrusion-detection systems from the viewpoint of detection value, nuisance-alarm rate, EMI, temperature, and salt-spray tests.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Volume II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

Emergency access procedures describe actions to be taken to maintain adequate safeguards levels when emergency response needs require bypassing normal access control.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

An emergency or standby battery system in its simplest form employs a battery and charger. Under normal conditions, the battery is maintained fully charged on automatic float/trickle, and a steady continuous load is supplied by the charger. If loss of A.C. supply or a breakdown of the charger occurs, the connected load is taken over by the battery without interruption of supply.

NRC DOCUMENTS

NUREG/CR-0509, "Emergency Power Supplies for Physical Security Systems"
R.G. 5.44, "Perimeter Instrusion Alarm Systems"
NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. Jesch, R. L., Berry, I. S.
   Electromagnetics Division, NBS
   Batteries Used With Law Enforcement Communications Equipment
   National Institute of Law Enforcement and Criminal Justice, U.S. Dept. of Justice LESP-RPT-0201.00, May 1972

   This report lists terms and definitions concerning batteries and their characteristics, reviews basic battery principles and types, and assembles performance characteristics of battery systems into chart form for comparative purposes.

DEFINITION

Emergency evacuation procedures specify actions to be taken in the event evacuation becomes necessary in order that (1) swift, orderly, and safe evacuation is ensured and (2) the bypassing of normal search and verification functions is offset by contingency measures that maintain adequate safeguards levels.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
Appendix C to 10 CFR Part 73
NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.55, "Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

Emergency exits are passageways and doors designated to channel personnel from an area in a quick, safe, and efficient manner during emergency situations.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"
R.G. 5.12, "General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

An emergency generator system is an independent self-contained system, including an engine or motor, an electric generator, and a fuel supply. Its purpose is to provide electric power to critical systems or components in the event of loss of commercial electricity.

NRC DOCUMENTS

NUREG/CR-0509, "Emergency Power Supplies for Physical Security Systems"
NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

Equipment checks and maintenance are the basic parts of a program to maintain equipment at intended functional and capability levels. Such a program also includes equipment operability tests, i.e., postmaintenance tests of equipment to verify correct performance.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"
NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.44, "Perimeter Intrusion Alarm Systems"
NUREG-0178, "Basic Considerations for Assembling a Closed-Circuit Television System"

OTHER DOCUMENTS

1. Henderson, J. T.
An Optimum Repair Level Analysis Developed for the BISS Program
Sandia Laboratories, Albuquerque, NM 87185
SAND 78-0060C, L978

This paper summarizes concepts used by Sandia Labs in translating the requirements of the Air Force for an optimum repair level analysis for the BISS Program into a computer program.

2. L. Kull et al.
Protection of Nuclear Power Plants Against Sabotage by an Insider
Science Applications, Inc., P.O. Box 2351
1200 Prospect St., La Jolla, CA 92037
SAI-77-868-LJ, October 1977

This report examines the safeguards measures and procedures that provide protection against the threat of nuclear reactor sabotage by a single insider. Several combinations of specific measures that could minimize this threat are proposed.

3. El-Bassioni et al.
Protection of Nuclear Power Plants Against Sabotage by Two Insiders
Science Applications, Inc., P.O. Box 2351
1200 Prospect St., La Jolla, CA 92037
SAI-77-965-LJ, January 1978

This report is a sequel to a report on a single-insider threat (SAI-77-868-LJ), in which specific safeguards were designed to protect against this threat. This report examines the effectiveness of those safeguards against the two-insider threat and recommends upgrade where vulnerabilities are found.

DEFINITION

Escorts are individuals designated by the licensee to accompany uncleared individuals or vehicles within controlled areas. The escort controls the movements of such persons or vehicles and prevents unauthorized activity or access. This differs from the "two-man rule" by not requiring the escort to possess technical knowledge of processes or equipment.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. L. Kull et al.
Protection of Nuclear Power Plants Against Sabotage by an Insider
Science Applications, Inc., P.O. Box 2351
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SAI-77-868-LJ, October 1977

This report examines the safeguards measures and procedures that provide protection against the threat of nuclear reactor sabotage by a single insider. Several combinations of specific measures that could minimize this threat are proposed.

DEFINITION

An explosive detector detects explosives by analyzing physical or chemical properties of material under test and comparing the results to known properties of explosive compounds. Hand-held (portable) detectors can be used to search packages for explosives.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"
R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 77-1033, September 1977

This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system, including operating characteristics and test results where available.

2. R. B. Moler et al.
New Concepts Symposium and Workshop on Detection and Identification
DOJ, DOT, U.S. Dept. of Treasury, DOE, 1978

This document has papers submitted at the October 30, 31, and November 1, 1978, symposium and workshop (new concepts) on detection and identification of explosives by new techniques (sponsored by the U.S. Dept. of Treasury, DOJ, DOT, and DOE).

3. Cummings, R. G.
Explosive Detection Technology Survey
USPS Research and Development Department
Office of Postal Technology Research
Electronic Sciences Division, Tech Note
PTR-11-76, March 1976

This survey report assesses the state of explosive detection technology that is applicable to current and potential mail problems through December 1975.

4. King, Rollwitz, Gonand
Application of Nuclear Magnetic Resonance Techniques to the Detection of Explosives
University of Kentucky, Caranhan Conference on Crime Countermeasures, BU No. 115, 1978 Proceedings

This document describes the technique of nuclear magnetic resonance as applied to the detection of concealed explosives. Two experimental systems are described. Their possible use in screening letters, small parcels, packages, and luggage or detecting buried explosives is outlined.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

An explosive detector detects explosives by analyzing physical or chemical properties of material under test and comparing the results to known properties of explosive compounds. Hand-held detectors can be used as part of an overall personnel search to ensure that explosives are not introduced into an area by entering individuals.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

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DOJ, DOT, U.S. Dept. of Treasury, DOE, 1978

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3. Cummings, R. G.
Explosive Detection Technology Survey
USPS Research and Development Department
Office of Postal Technology Research
Electronic Sciences Division, Tech Note
PTR-11-76, March 1976

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DEFINITION

An explosive detector detects explosives by analyzing physical or chemical properties of material under test and comparing the results to known properties of explosive compounds. Hand-held detectors can be used as part of an overall vehicle search to ensure that explosives are not introduced into an area by incoming vehicles.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

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   SAND 77-1033, September 1977

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2. R. B. Moler et al.
   New Concepts Symposium and Workshop on Detection and Identification
   DOJ, DOT, U.S. Dept. of Treasury, DOE, 1978

   This document has papers submitted at the October 30, 31, and November 1, 1978, symposium and workshop (new concepts) on detection and identification of explosives by new techniques (sponsored by the U.S. Dept. of Treasury, DOJ, DOT, and DOE).

3. Cummings, R. G.
   Explosive Detection Technology Survey
   USPS Research and Development Department
   Office of Postal Technology Research
   Electronic Sciences Division, Tech Note
   PTR-11-76, March 1976

   This survey report assesses the state of explosive detection technology that is applicable to current and potential mail problems through December 1975.

4. King, Rollwitz, Gonand
   Application of Nuclear Magnetic Resonance Techniques to the Detection of Explosives
   University of Kentucky, Caranhan Conference on Crime Countermeasures, BU No. 115, 1978 Proceedings

   This document describes the technique of nuclear magnetic resonance as applied to the detection of concealed explosives. Two experimental systems are described. Their possible use in screening letters, small parcels, packages, and luggage or detecting buried explosives is outlined.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

An explosive detector detects explosives by analyzing physical or chemical properties of material under test and comparing the results to known properties of explosive compounds. Volume detectors are fixed systems that detect explosives within the detector volume.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 77-1033, September 1977

This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system, including operating characteristics and test results where available.

2. R. B. Moler et al.
New Concepts Symposium and Workshop on Detection and Identification
DOJ, DOT, U.S. Dept. of Treasury, DOE, 1978

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Sandia Contract No. 058748, August 1978

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DEFINITION

An explosive detector detects explosives by analyzing physical or chemical properties of material under test and comparing the results to known properties of explosive compounds. Walk-through detectors are fixed systems which detect explosives moving through the detector volume.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

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SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A fence system is a barrier constructed of posts, wire, metal, or like material that impedes entry or exit by personnel or vehicles into or out of a specified area.

NRC DOCUMENTS

NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. Fite, Robert A. and Kilpatrick, Stuart
Joint Services Perimeter Barrier Penetration Evaluation
Counter Intrusion Laboratory
Intrusion Detection Division, DRDME-XI
U.S. Army Mobility Equipment, Research and Development Command
Ft. Belvoir, VA 22060, 2208, April 1977

   This document reports the results of tests to determine the effectiveness of various fence configurations subjected to attack by skilled intruders using various attack methods, including explosive breaching techniques.

2. **Barrier Technology Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

3. **Federal Specification, Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)**
Naval Facilities, Engineering Command
Alexandria, VA 22332, RR-F-191G/Gen - General Specification

   This publication provides Federal specifications for chain-link fencing fabric, gates, posts, top rails, and accessories.

4. **Federal Specification, Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)**
Naval Facilities, Engineering Command
Alexandria, VA 22332, RR-F-191/3A - Chain-Link Fence Post & Top Rail, and Braces (Detail Specs)

   This publication provides Federal specifications for chain-link fencing fabric, gates, posts, top rails, and accessories.

5. **Federal Specification, Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)**
Naval Facilities, Engineering Command
Alexandria, VA 22332
RR-F-191/4A - Chain-Link Fence Accessories (Detail Specs)

   This publication provides Federal specifications for chain-link fencing fabric, gates, posts, top rails, and accessories.

DEFINITION

This topic concerns floors for security areas.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"
NUREG/CR-1378, "Hardening Existing SSNM Storage Facilities"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. Moore, Raymond T.
   Barrier Penetration Tests
   National Bureau of Standards
   NBS Technical Note 837, June 1974

   This note reports the results of penetration tests of sixteen structural barriers to determine their resistance to forcible penetration.

3. Lorman, William R.
   Assessment of Various Constructional Materials as Armor for Protecting USN Shore Facilities Exposed to Small-Arms Fire (U)
   Naval Facilities Engineering Command
   CEL-TR No. N-1509, December 1977

   This report quantifies the minimum thicknesses and corresponding weights and costs per square foot of surface areas required of various homogenous and composite armors to defeat high-velocity low-mass ballistic rounds fired at a nominal 25-yard range. Thus, the structural engineer can select relatively low-cost materials (metallic, polymeric, and glass and inorganic nonmetallic) for use in such construction.

4. Moore, R. T.
   Penetration Resistance Tests of Reinforced Concrete Barriers
   Institute for Computer Sciences and Technology
   NBSIR 73-101, December 1972

   This report describes the results of a series of penetration tests on six concrete slabs.

5. Odello, Robert J.
   Attack Resistant Walls--Preliminary Tests
   Naval Facilities Engineering Command
   CEL-TN No. N-1508, December 1977

   Eight different concepts for attack-resistant walls were conceived and analyzed to determine methods for estimating denial times. In addition to acting as structural components, these walls were intended to provide 20 to 30 minutes of denial time against penetration by a determined group of attackers with hand, power, and burning tools. The analysis included estimates of denial time, cost, weight, and thickness.

DEFINITION

Functional zoning is a form of work rule design that specifies sets of functions, in such a way that one individual (either a guard or other employee) may perform all the functions in one set but may not perform any functions in any other set.

NRC DOCUMENTS

NUREG/CR-0532, "Safeguards Against Insider Collusion" (Volume I)

OTHER DOCUMENTS

1. J. Glancy et al.
   Analysis of Nuclear Fuel Facility Safeguards Threats Involving Insider Collusion
   Science Applications, Inc., P.O. Box 2351
   1200 Prospect St., La Jolla, CA 92037
   SAI-78-547-LJ, April 1978

   This report describes a methodology fo analyzing the insider collusion threat and suggests ways to minimize that threat.

DEFINITION

The term "gates and associated hardware" includes the characteristics of and specifications for gates, hinges, openers and closers, latches, and any other equipment used with the gate that could affect its protective function.

NRC DOCUMENTS

NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. **Federal Specifications, Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)**
   Naval Facilities, Engineering Command
   Alexandria, VA 22332, RR-F-191G (Gen - General Specification, RR-F-191/1A - Chain-Link fabric, RR-F-191/2A - Chain-Link Fence Gates (Detail Specs), RR-F-191/3A - Chain-Link Fence Post & Top Rail, and Braces (Detail Specs), RR-F-191/4A - Chain-Link Fence Accessories (Detail Specs)

   This publication provides Federal specifications for chain-link fencing fabric, gates, posts, top rails, and accessories.

DEFINITION

Guard force personal equipment includes items carried and used by a guard for personal protection or to aid in accomplishing assigned duties.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.20, "Training, Equipping, and Qualifying of Guards and Watchmen"
NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
   NILECJ Standard on the Ballistic Resistance of Police Body Armor
   National Institute of Law Enforcement and Criminal Justice, NILECJ-STD-0101.00, March 1972

   This report contains voluntary standard performance requirements and testing methods for the ballistic resistance of police body armor.

2. Law Enforcement Assistance Administration
   NILECJ Standard for Portable Ballistic Shields
   National Institute of Law Enforcement and Criminal Justice, NILECJ-STD-0108.00, May 1974

   This document establishes performance requirements and a testing method for the ballistic resistance of portable ballistic shields protecting against gunfire.

DEFINITION

Guard force qualifications are capabilities and requirements that guard force personnel must meet to ensure a satisfactory effectiveness level. They include such items as firearm training and requirements and participation in training programs to produce a thorough knowledge of proper operating procedures.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.20, "Training, Equipping, and Qualifying of Guards and Watchmen"

OTHER DOCUMENTS

1. **Coast Guard Physical Protection Standards**
   U.S. Coast Guard (G-OIS/74), CG-468, December 1977

   This report establishes Coast Guard Standards for the protection of installation, property, information, and personnel.

DEFINITION

Guard patrols and intervention concerns the proper operating procedures to be used during normal guard patrols and non-routine guard intervention situations, including random guard assignments and patrols and guard-dispatching techniques.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.55, "Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities"
R.G. 5.20, "Training, Equipping, and Qualifying of Guards and Watchmen"
R.G. 5.43, "Plant Security Force Duties"
NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. NiCastro, J. R.
Introductory Analysis of Safeguards Vulnerability to Security Force Collusion
Science Applications, Inc.
8400 Westpark Drive, McLean, VA 22101
SAI Report No. 76-681-WA, December 1976

This document reports the findings of a brief study of the vulnerabilities of a facility to collusion by members of its security force.

2. C. Auerbach et al.
Issues Related to Choosing a Guard Force Structure
Technical Support Organization
Brookhaven National Laboratory
Upton, N.Y. 11973, BNL-20129, May 1975

This paper summarizes a study to identify issues relevant to choosing between the private guard forces presently employed by industry and a guard force under Federal authority as protectors of nuclear material.

DEFINITION

Guard post assignments concern procedures for assigning security personnel to post duties, including consideration of rotation cycles, designation of those responsible for determining such assignments, and the use of work rules, if any, to minimize collusion.

NRC DOCUMENTS

NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. NiCastro, J. R.
   Introductory Analysis of Safeguards Vulnerability to Security Force Collusion
   Science Applications, Inc.
   8400 Westpark Drive, McLean, VA 22101
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   This document reports the findings of a brief study of the vulnerabilities of a facility to collusion by members of its security force.

2. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguards control and communication system functions and (2) evaluating existing commercial systems.

DEFINITION

Hardwire video systems are systems that employ CCTV for a specified purpose (e.g., monitoring/surveillance or detecting intrusions when used with a video motion detector) and that use hardwire cabling to transmit the signal from the camera to the monitor.

NRC DOCUMENTS

NUREG-0178, "Basic Considerations for Assembling a Closed-Circuit Television System"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

The infrared beam sensor system consists of a transmitter (IR source), a receiver (photodetector), and appropriate lenses. It is basically a line-of-sight device, requires uniform terrain, and is usually employed in a multibeam configuration forming a vertical fence.

NRC DOCUMENTS

R.G. 5.44, "Perimeter Intrusion Alarm Systems" (Rev. 1)
NUREG-0320, "Interior Intrusion Alarm Systems"

OTHER DOCUMENTS

1. Cravens, M. N.
Established Characteristics of Exterior Intrusion Alarm System (U) Confidential NSI
Sandia Laboratories, Albuquerque, NM 87185
SAND 76-0296 CNSI, July 1976

This report lists 46 exterior alarm systems for which performance data are available. Detailed characteristics and descriptions are given for 10 systems that could protect facilities.

2. **Intrusion Detection Handbook**
Sandia Laboratories, Albuquerque, NM 87185
SAND 76-0554, November 1977

This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

3. Fite, Robert A.
Commercial Perimeter Intrusion Detection Equipment Evaluation
Counter Intrusion Laboratory
Intrusion Detection Division, DRDME-XI
U.S. Army Mobility Equipment Research and Development Command
Ft. Belvoir, VA 22060, 2209, May 1977

This report evaluates commercial outdoor intrusion-detection systems from the viewpoints of detection value, nuisance-alarm rate, EMI, temperature, and salt-spray tests.

4. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

This volume contains amassed generic data that characterize the various classes and types of security equip- that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

5. Agranoff, M. A.
An Evaluation of Perimeter Protection Systems Available
Security Management
American Society for Industrial Security
2000 K Street NW., Washington, D.C., September 1977

This report reviews available exterior intrusion-detection systems and compares the most commonly used perimeter sensors.

43. Interface Between Alarm Station and Sensors
- Individual Hardwire Alarms
- Multiplexed Hardwire Alarms
- Hardwire Command Signals

DEFINITION

Individual hardwire alarms provide communication between an individual alarm and the CAS/SAS via a dedicated wire pair for each sensor-indicator combination.

Multiplexed hardwire alarms allow several sensors to share one communication line (i.e., wire pair) to the CAS/SAS. Varieties of multiplexing differ in the way the line is shared. This can range from a simple party line concept (series line) to time division multiplexing (TDM).

Hardwire command signals provide a means of remotely polling a number of sensors to determine their operational status.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 75-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguards control and communication system functions and (2) evaluating existing commercial systems.

3. Ahrens, Janet S.
   A Survey of Secure Alarm Communication Systems
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0550, December 1976

   This document reports the results of a broad survey of techniques providing secure communication links for alarm signals. Categories of security techniques are defined, including both protective systems and numerous supervisory techniques.

4. Scala, Sigmund
   Alarm Signal Transmission Concepts
   Stanford Research Institute, Menlo Park, CA
   SDD-TN-111, April 1975

   This technical note develops the spectrum of feasible alarm message transmission concepts and examines some constraints and limitations of such concepts.

5. Zushin, Albert R.
   Line Supervisory Techniques
   University of Kentucky, Carnahan Conference on Crime Countermeasures, 1974 Proceedings
   BU No. 105, August 1974

   This report discusses how to select the best supervisory system for particular situations based on the potential threat, susceptibility to compromise, false alarms, and cost. The vulnerability to compromise of the types of line supervision, also is discussed.

6. S. Scala, G. C. Byrne, T. Kovattana, D. Lohr, and F. A. Schooley
   External Alarm Transmission Media Evaluation
   Stanford Research Institute, Menlo Park, CA
   SRI Project 3755, May 1975

   This study evaluates and compares media that may be suitable through the 1980's for the transmission of alarm signals, particularly as applied to future low-cost residential or small business burglar alarms.

DEFINITION

An isolation zone is an area adjacent to a physical barrier that is clear of all objects that could conceal or shield an individual.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

DEFINITION

This topic involves the use of trained dogs for the detection of explosives or weapons that may be concealed in packages or in vehicles.

NRC DOCUMENTS

NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. Phillips, Ray C.
Training Dogs for Explosive Detection, Interim Report 2
U.S. Army Warfare Laboratory, Aberdeen Proving Ground, MD 21005, Technical Memorandum No. LWL-CR-01B70, October 1971

   This document describes how to train a dog to search out and respond to specific explosives.

2. Knauf, Henry, Johnston, William H.
Evaluation of Explosive/Narcotics (EXNARC) Detection Dogs
Mine Detection Division, CounterMine/Counter Intrusion Department, MERADCOM, Ft. Belvoir, VA 22060
MERADCOM Report 2102, May 1974

   This report describes the performance evaluation of three dogs trained to detect heroin and explosives. The tests were designed to determine capabilities and limitations of dogs to search out explosives samples in various areas such as office spaces, aircraft, and residences.

3. Krauss, Max
Explosive Detecting Dogs, Final Report
U.S. Army Land Warfare Lab.
Aberdeen Proving Ground, MD 21005
Technical Report 71-11, September 1971

   This report gives the results of a feasibility study to determine the effectiveness of dogs trained to discriminate between the odors of commercial dynamite, black powder, and plastic explosives C3 and C4.

4. DOT–FAA
LEAA FAA K-9 Program Utilization
DOT-FAA, 1978

   This document reports, as of January 1, 1978, total explosives found nationwide by LEAA-FAA K-9 explosives detectors.

5. **U.S. Army Physical Security Field Manual**
Department of the Army
FM 19-30, November 1971

   This manual provides guidance to all personnel responsible for or directly concerned with the Military Police Corps' functional area of physical security.

DEFINITION

These devices annunciate at a sensor's location, when the sensor is stimulated to alarm. Such items as buzzers, bells, or flashing lights produce an immediate response from personnel in the area. Examples of this type of alarm are criticality alarms found in areas where SSNM is processed and door alarms that annunciate upon unauthorized opening.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

See 10 CFR Sec. 73.2(m).

NRC DOCUMENTS

R.G. 5.12, "General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. **Military Specification -- Locks and Lock Sets, Exterior, Ordnance, High Security**
   Naval Construction Battalion Center, Port Hueneme, CA 93043, Mil-L-29151(YD), January 1975

   This report provides military specifications for key-operated high-security dual-bolt locks and lock sets for use in securing ordnance material.

3. **Military Specification - Padlocks and Padlock Sets, Key Operated, Medium Security, Regular Shackle**
   U.S. Army Natick Research and Development Command, Natick, MA 01760
   MIL-P-43951, June 1976

   This report contains military specifications on two styles of medium security padlocks.

4. **Standards for Key Locks**
   Underwriters Laboratories, Inc.
   333 Pfingsten Rd., Northbrook, IL 60062
   UL 437 Third Edition, January 1975

   This paper presents standards for the construction and performance of key locks to include door locks, locking cylinders, and two-key locks.

5. **Military Specifications for HASPS, High Security Padlocks**
   Department of the Army, U.S. Army Natick Development Center, Natick, MA 01760
   MIL-H-43905A General Specifications

   This report provides military specifications for high-security padlocks and hasps.

DEFINITION

Manual alarm recording is a method used to manually record incoming alarms at the CAS/SAS. It includes type of information to be recorded, format, and period of time records must be retained.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

A master (fixed) radio is a two-way voice communicator that is mounted at a fixed location and operates on alternating current. It has the same transmitting and receiving capabilities as a portable radio, with the advantages of greater range (8 to 10 miles) and ability to override weaker units.

NRC DOCUMENTS

R.G. 5.55, "Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities"
NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
Fixed and Base Station FM Transmitters
National Institute of Law Enforcement and Criminal Justice, U.S. Dept. of Justice, NILECJ-STD-0201.00, September 1974

   This study contains performance requirements and test methods for frequency modulated fixed and base station transmitters used by law enforcement agencies.

2. Law Enforcement Assistance Administration
Fixed and Base Station FM Receivers
National Institute of Law Enforcement and Criminal Justice, U.S. Dept. of Justice, NILECJ-STD-0206.00, September 1975

   This study contains performance requirements and base station receivers used by law enforcement agencies.

3. Law Enforcement Assistance Administration
Fixed and Base Station Antennas
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice NILECJ-STD-0204.00, November 1977

   This study contains minimum performance requirements and test methods for antennas used at base stations and fixed sites.

4. Law Enforcement Assistance Administration
FM Repeater Systems
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice NILECJ-STD-0213.00, November 1977

   This study contains established performance requirements and test methods for frequency modulated repeater systems.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

An exterior microwave system is essentially a line-of-sight intrusion-detection device that employs a modulated transmitter and a receiver installed some distance apart. The received signal is the vector sum of the direct transmitted signal and signals reflected from the ground and obstacles in the path of the transmitted beam. Detection is based on the fact that a moving object will cause a change in the vector sum of the received signals.

NRC DOCUMENTS

R.G. 5.44, "Perimeter Intrusion Alarm Systems" (Rev. 1)
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. Cravens, M. N.
   Established Characteristics of Exterior Intrusion Alarm Systems (U) Confidential NSI
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0296 CNSI, July 1976

   This document lists 46 exterior alarm systems for which performance data are available. Detailed characteristics and descriptions are given for 10 systems that could protect facilities.

3. Fite, Robert A.
   Commercial Perimeter Intrusion Detection Equipment Evaluation
   Counter Intrusion Laboratory, Intrusion Detection Division, DRDME-XI, U.S. Army Mobility Equipment Research and Development Command,
   Fort Belvoir, VA 22060, 2209, May 1977

   This report evaluates commercial, outdoor, intrusion-detection systems from the viewpoints of detection value, nuisance-alarm rate, EMI, temperature, and salt-spray tests.

4. Engle, C. R.
   Performance Assessment of Bistatic Microwave Fence Sensors
   Naval Avionics Facility, Ind., TR-2155
   November 1976

   The report summarizes performance characteristics of typical single-beam bistatic microwave fence sensors based on operational testing and a theoretical analysis of detection coverage. It also presents a theoretical analysis of multibeam microwave fence sensors.

DEFINITION

A mobile radio is a two-way voice communicator that is mounted in a vehicle and operates from the electric power of that vehicle. It has essentially the same capabilities as a portable radio but has a greater range.

NRC DOCUMENTS

R.G. 5.55, "Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
Mobile FM Transmitters
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0202.00, October 1974

   This study contains performance requirements and test methods for frequency modulated mobile and vehicular transmitters.

2. Law Enforcement Assistance Administration
Mobile FM Receivers
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0207.00, June 1975

   This study contains performance requirements and test methods for frequency modulated mobile and vehicular receivers used by law enforcement agencies.

3. Law Enforcement Assistance Administration
RF Coaxial Cable Assemblies for Mobile Transceivers
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0212.00, September 1975

   This study contains established requirements and test methods for RF coaxial cable assemblies used with mobile transceivers.

4. Law Enforcement Assistance Administration
Mobile Antennas
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0205.00, May 1974

   This study contains minimum performance requirements and test methods for mobile antennas mounted on vehicles used by law enforcement agencies.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

There are two types of interior infrared (IR) beam systems that are used to detect motion. An active interior infrared system operates similarly to an exterior system (a relatively narrow beam IR transmitter "shoots" at the receiver; "tripping" of the beam reduces the signal at the receiver, which produces an alarm). A passive infrared system is single-ended and operates over an area detecting changes in temperature, i.e., infrared radiation, within its field of view. Its detection principle is based on the fact that all human beings radiate infrared energy.

Interior microwave systems are typically monostatic, employing a single antenna for both the transmit and the receive functions. Detection is based on Doppler frequency shift.

Ultrasonic systems consist of a transmitter that transmits acoustic energy in the ultrasonic range and a receiver that receives the acoustic energy reflected within the room. A moving object will cause a shift in the received signal; when the signals are compared at the receiver; any difference between signals will produce an alarm.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

3. **Selection and Application of Joint-Services Interior Intrusion Detection System (J-SIIDS)**
   U.S. Air Force HQS, Washington, D.C. 20330
   U.S. Army TB-5-6350-262, U.S. Navy NAVELEX 0967-464-9010, U.S. Air Force TO-3159-1-101
   February 1974

   This report provides guidelines for the selection of J-SIIDS components.

4. Dunn, D. R.
   Performance Analysis of an Infrared Interior Intrusion Detection
   Lawrence Livermore Laboratory, UCID-17888
   May 1978

   This report develops a methodology for characterizing the performance of a class of infrared interior intrusion monitors or detectors.

5. Garrett, William C.
   Infrared Motion Sensor Evaluation
   Counter Intrusion Lab, Intrusion Detection Div.; DRDME-XI: U.S. Army Mobility Equipment Research and Development Command, Fort Belvoir, VA 22060, 2237, March 1978

   This report describes the results of a series of tests made to obtain data on the sensor's detection capability and susceptibility to false alarm stimuli. A model 19-115 Infrared Intrusion Sensor, manufactured by Barnes Engineering, was used in the tests.

6. Redmann, J. J.
   Performance and Reliability Evaluation of a Passive Infrared Intruder Sensor (ROSSIN)
   Aerospace Corporation, ART-76(8904)-1,
   March 1976

   This report gives results of tests conducted on the Rossin infrared intruder sensor.

DEFINITION

The multi-man rule requires that an individual in an area be accompanied by one or more technically competent individuals who will detect any incorrect or unauthorized procedures by observing the other person at all times.

NRC DOCUMENTS

NUREG/CR-0532, "Safeguards Against Insider Collusion" (Vol. I)

OTHER DOCUMENTS

1. L. Kull et al.
   Protection of Nuclear Power Plants Against Sabotage by an Insider
   Science Applications, Inc., P.O. Box 2351
   1200 Prospect St., La Jolla, CA 92037
   SAI-77-868-LJ, October 1977

   This report examines the safeguards measures and procedures that provide protection against the threat of nuclear reactor sabotage by a single insider. Several combinations of specific measures that could minimize this threat are proposed.

2. El-Bassioni et al.
   Protection of Nuclear Power Plants Against Sabotage by Two Insiders
   Science Applications, Inc., P.O. Box 2351
   1200 Prospect St., La Jolla, CA 92037,
   SAI-77-965-LJ, January 1978

   This report is a sequel to a report on a single-insider threat (SAI-77-868-LJ) in which specific safeguards were designed to protect against this threat. This report examines the effectiveness of those safeguards against the two-insider threat and recommends upgrading where vulnerabilities are found.

DEFINITION

Night vision devices are devices with the capability to enhance image quality in viewing areas with a low light level. They may be either active or passive.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
   Active Night Vision Devices
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   NILECJ-STD-0305.00, June 1975

   This report contains performance requirements and test methods for active night vision devices used for law enforcement. It applies to devices that employ single-stage electrostatically focused image intensifier tubes having a maximum effective diameter of 25mm, a photocathode with S-1 sensitivity, and an infrared light source.

2. Law Enforcement Assistance Administration
   Passive, First Generation Night Vision Devices
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   NILECJ-STD-0304.00, June 1975

   This report contains performance requirements and test methods for passive night vision devices used for law enforcement. It applies to first-generation devices that employ three-stage electrostatically focused image intensifier tubes having a maximum effective diameter of 25 mm and that operate at night in the absence of operator-supplied artificial illumination.

3. Joseph C. Richmond, Heat Division, NBS
   Survey of Image Quality Criteria for Passive Night Vision Devices
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   LESP-RPT-0301.00, June 1974

   This report is a preliminary survey of image quality evaluation techniques that have been described in the literature. It discusses their merits for use in a standard for passive night vision devices.

4. Joseph C. Richmond, Heat Division, NBS
   Test Procedures for Night Vision Devices
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   LESP-RPT-0302.00, July 1974

   This report describes test procedures and parameters for evaluating night vision devices.

5. Charles Grover, Photographic Engineering and Service Division, Naval Ordnance Laboratory
   Simplified Procedures for Evaluating the Image Quality of Objective Lenses for Night Vision Devices
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   LESP-RPT-0304.00, May 1974

   This document describes two methods for determining the comparative image quality of objective lenses intended for use of night vision devices for law enforcement applications.

DEFINITION

The pat-down search is a search of a person for the presence of contraband. The search is made by feeling for contraband of moderate size and bulk concealed on the person or in the person's outer clothing.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. Newhouser, Ron
   Comments on the Value and Effectiveness of a Pat-Down Search in the Detection of Concealed Explosives
   Emergency Programs Center, Office of the Deputy Attorney General, Department of Justice
   February 1978

   This report discusses the value and effectiveness of an external pat-down search of outer clothing to detect concealed explosives.

DEFINITION

Personal identification numbers and passwords are unique digits or words assigned to an individual that are used for personal identification. Quite often they are used in conjunction with or as part of other identifying means such as magnetically coded card systems.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. Wood, Helen M.
The Use of Passwords for Controlled Access to Computer Resources
National Bureau of Standards
NBS Special Publication 500-9, May 1977

This report describes the use of passwords for controlled access to computer resources.

DEFINITION

Photo identification badges are photo badges that are color- or number-coded to correspond with specific areas within which the holders of those badges are authorized.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. Yonemura, Gary T.
   Image Quality Criterion for the Identification of Faces
   NBS, LESP-RPT-0303.00, May 1974

   The purpose of this study is to determine, experimentally, the observers' perception of the image quality required for the identification of faces, as determined by two criteria: (1) the average observer and (2) 90 percent of the population. The subjective response from the human observer was then transformed into a physical descriptor amenable to direct measurement by instruments.

2. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

DEFINITION

These controls consist of the equipment used to contain records and hardware related to all lock use (such as keys, combinations, and authorization lists). They also include procedures that limit the use of devices necessary to open individual locks and routines that further limit the access to certain authorized times.

NRC DOCUMENTS

R.G. 5.12, "General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **U.S. Army Physical Security Field Manual**
   Dept. of the Army, FM 19-30, November 1971

   This manual provides guidance to all personnel responsible or directly concerned with the Military Police Corps' functional area of physical security.

2. **Dept. of Transportation Physical Security Manual**
   Dept. of Transportation, DOT 1600.26
   November 1977

   This manual provides guidance to those directly or indirectly responsible for the development and maintenance of the physical security program at DOT facilities, serves as an aid and reference source in selecting and using security-control measures, and establishes basic standards and criteria for the procurement and use of security equipment.

3. Department of Army
   Nuclear and Chemical Weapons and Material Chemical Surety Program
   Headquarters, Department of the Army
   Washington, D.C., Army Regulation No. 50-6
   November 1976

   This regulation establishes the Chemical Surety Program and its objectives. It assigns responsibilities and prescribes procedures for the safe, secure, and reliable life-cycle management of chemical agents and munitions and their associated weapon systems.

4. **Nuclear Surety -- Nuclear and Chemical Weapons and Material**
   Headquarters, Department of the Army, Washington, D.C., AR 50-5, July 1976

   This regulation establishes policies and prescribes procedures for establishing and maintaining the safety, security, and reliability of nuclear weapons in the custody of the U.S. Army.

DEFINITION

A portable radio is a hand-held battery-operated two-way voice communicator. It is capable of transmission between fixed, mobile, or other portable units on the same frequencies within an average effective range of 0.5 mile.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
Personal/Portable FM Transmitters
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0203.00, October 1974

   This study presents established performance requirements and test methods for frequency modulated personal and portable transmitters used by law enforcement agencies.

2. Law Enforcement Assistance Administration
Personal/Portable FM Receivers
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0208.00, October 1975

   This study presents established performance requirements and test methods for frequency modulated personal and portable receivers used by law enforcement agencies.

3. Law Enforcement Assistance Administration
Batteries for Personal/Portable Transceivers
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0211.00, June 1975

   This study presents established performance requirements and test methods for batteries used in personal and portable transceivers.

4. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A fingerprint personnel identity verification system is a system that scans the fingerprints of an individual who desires to enter a security area. This information is then compared with stored data for verification of identity.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. John L. Muerle, Claron W. Swonger and Carmen J. Tona; Calspan Technology Products, Inc.
   EDP Security Through Positive Personal Identification
   1974 Carnahan and International Crime Countermeasures Conference, UKY BU105, August 1974

   This report discusses the requirements for positive personal identification. It presents, in detail, the Calspan Fingerscan (fingerprint identification) System.

2. **Guidelines on Evaluation of Techniques for Automated Personnel Identification**
   U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20324, FIPS PUB 48 April 1977

   This report provides guidelines on the selection and evaluation of techniques for automatically verifying the identity of individuals seeking access to computer systems and networks via terminals.

3. **Presentation of Findings, Individual Identification Devices**
   Defense Intelligence Agency, May 1975

   This report presents the results of tests conducted on two individual identification devices, a fingerprint scanner and a device that uses hand geometry, and prevents conclusions and recommendations.

4. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

DEFINITION

A handwriting personnel identity verification system is an automatic system that senses the characteristics of the handwriting of an individual desiring entry and compares them to an established data base containing valid handwriting data from that person.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. **Guidelines on Evaluation of Techniques for Automated Personnel Identification**
   U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234, FIPS PUB 48 April 1977

   This report provides guidelines on selection and evaluation of techniques for automatically verifying the identity of individuals seeking access to computer systems and networks via terminals.

2. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

3. Warfel, George H.
   Automated Identification Methods
   Security Management, American Society for Industrial Security, 2000 K St. NW., Washington, D.C.
   Vol. 22, No. 6, June 1978

   This article summarizes the book, "Identification Technologies." All current methods of identification are discussed and compared in the book, along with a general treatise on ID today. This summary discusses the philosophy of automated ID and mass ID and some of the methods and devices currently on the market.

4. Ellis, R. J., Mitre Corporation
   The Criminal Use of False Identification, Appendix C2, Automated Identification Technology
   U.S. Department of Justice, Federal Advisory Committee on False Identification 052-003-00226-4
   November 1976

   This report summarizes the nature, scope, and impact of criminal use of false identification in the United States with recommendations to combat the problem. Appendix C2 deals specifically with [illegible] niques and equipment.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. I**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A hand geometry personnel identity verification system is an automatic system that senses the physical measurements of the hand of a person desiring entry. It then compares those measurements to an established data base containing valid hand dimension data for that person.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. **Guidelines on Evaluation of Techniques for Automated Personnel Identification**
   U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234, FIPS PUB 48 April 1977

   This report provides guidelines on the selection and evaluation of techniques for automatically verifying the identity of individuals seeking access to computer systems and networks via terminals.

2. **Presentation of Findings, Individual Identification Devices**
   Defense Intelligence Agency, May 1975

   This report presents the results of tests conducted on two individual identification devices, a fingerprint scanner and a device that uses hand geometry, and prevents conclusions and recommendations.

3. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

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4. Ellis, R. J., Mitre Corporation
   The Criminal Use of False Identification, Appendix C2, Automated Identification Technology
   United States Department of Justice, Federal Advisory Committee on False Identification
   052-003-00226-4, November 1976

   This report summarizes the nature, scope, and impact of criminal use of false identification in the United States with recommendations to combat the problem. Appendix C2 deals specifically with automated techniques and equipment.

5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A voiceprint personnel identity verification system is an automatic system that senses the characteristics of the voice of an individual desiring entry and compares them to an established data base containing valid voice characteristics data from the person.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. **Guidelines on Evaluation of Techniques for Automated Personnel Identification**
   U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234, FIPS PUB 48 April 1977

   This report provides guidelines on the selection and evaluation of techniques for automatically verifying the identity of individuals seeking access to computer systems and networks via terminals.

2. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

3. Warfel, George H.
   Automated Identification Methods
   Security Management, American Society for Industrial Security, 2000 K St. NW., Washington, D.C.
   Vol. 22, No. 6, June 1978

   This article summarizes the book, "Identification Technologies." All current methods of identification are discussed and compared in the book, along with a general treatise on ID today. This summary discusses the philosophy of automated ID and mass ID and some of the methods and devices currently on the market.

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   November 1976

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5. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

Response vehicles are vehicles used by a guard force to facilitate quick response to nonroutine events. During routine operations, such vehicles are often used to augment foot patrols.

NRC DOCUMENTS

None were identified during the course of this project.

OTHER DOCUMENTS

1. Massey, R. G.
   The Police Patrol Car: State of the Art
   NBS, LESP-RPT-0403.00, July 1975

   This study develops an understanding of the vehicles, accessories, and options available for police patrol, the activities for which patrol cars are used, and problems encountered when performing the required activities with the available vehicles.

2. E. R. Jones et al.
   Summary Reports on Emergency Vehicle Sirens
   NBS, LESP-RPT-0502.00, September 1974

   This report describes the results of a test program using 23 test automobiles, 4 electronic sirens, and 9 electromechanical sirens. The efficacy of using the siren as a warning device on an emergency vehicle is discussed.

3. E. T. Pierce et al.
   Emergency Vehicle Warning Devices
   NBS, LESP-RPT-0501.00, May 1972

   This report describes the activities carried out from the initiation of the program through July 1971 on the preparation of performance standards for emergency vehicle warning devices (lights and sirens).

4. R. G. Massey and W. F. Druckenbrod
   Terms and Definition from Police Patrol Cars
   NBS, LESP-RPT-0401.00, May 1974

   This document contains the definition of terms for four-wheeled on-road vehicles used in law enforcement. The terms and definitions have been selected on the basis of usefulness to those responsible for selection, procurement, and use of these vehicles.

DEFINITION

This topic concerns roofs for security areas.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"
NUREG/CR-1378, "Hardening Existing SSNM Storage Facilities"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. Odello, Robert J.
   Attack Resistant Frangible Roof Concepts -Preliminary Tests
   Naval Sea Systems Command, CEL-TM 51-78-04
   November 1977

   This report discusses three construction concepts for frangible roofs with a density less than 10 lb/ft^2, with the results of penetration tests made on samples of each of the three concepts.

3. Lorman, William R.
   Assessment of Various Constructional Materials As Armor for Protecting USN Shore Facilities Exposed to Small-Arms Fire (U)
   Naval Facilities Engineering Command, CEL-TR No. N-1509, December 1977

   This report quantifies the minimum thicknesses and corresponding weights and costs per square foot of surface areas required of various homogeneous and composite armors to defeat high-velocity low-mass ballistic rounds fired at a nominal 25-yard range. Thus, the structural engineer can select relatively low-cost materials (metallic, polymeric and glass and inorganic nonmetallic) for use in such construction.

4. Moore, R. T.
   Penetration Resistance Tests of Reinforced Concrete Barriers
   Institute of Computer Sciences and Technology, NBSIR 73-101, December 1972

   This report describes the results of a series of penetration tests of six concrete slabs.

5. Warren, G.
   Small-Arm Resistance of Concrete Masonry Unit Walls
   Civil Engineering Laboratory, CEL-51-75-01
   April 1975

   The objective of this study was to demonstrate the ballistic resistance capability of concrete masonry unit (CMU) construction. The performance of the concrete block construction was experimentally verified against the fire of several civilian and service weapons. This study includes test results and recommendations and conclusions.

DEFINITION

Pedestrian sally ports are access control areas (sometimes referred to as "man traps" or entry holding areas) that normally consist of an electrically controlled door separating an uncontrolled area from the sally port and a second electrically controlled door separating the sally port from the area to which access is being controlled. Persons desiring entry are admitted to the sally port through the first barrier, where identity verification and search procedures are conducted, before admittance is granted through the second door to the controlled area.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

Vehicular sally ports serve the same function as pedestrian sally ports but differ in size and construction in order to admit vehicles.

NRC DOCUMENTS

NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

A shielding detector is a portal metal detector capable of detecting material that could be used to shield special nuclear material. This type can detect material anywhere within its volume, whether or not the metal material is moving.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

DEFINITION

A shielding detector is a portal metal detector capable of detecting metal that could be used to shield special nuclear material. This type requires a moving metal object as a stimulus for detection.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
NUREG/CR-0543, "CAS and SAS Planning Document"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of these elements, including operating characteristics and test results where available.

DEFINITION

This is any vessel or package used to contain SNM, especially any container that meets the definition of paragraph 71.4(c) "Containment vessel," as opposed to "package" and "packaging," as defined in paragraphs 71.4(k) and (l).

NRC DOCUMENTS

NUREG/CR-0591, "Current Usage of Containers for SNM Storage, Transfer, and Measurement"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

SNM detectors are devices that detect the presence of gamma or neutron emissions indicative of special nuclear material. Hand-held detectors can be used for searching packages for concealed SNM.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

SNM detectors are devices that detect the presence of gamma or neutron emissions indicative of special nuclear material. Hand-held detectors can be used for searching individuals for concealed SNM.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

SNM detectors are devices that detect the presence of gamma or neutron emissions indicative of special nuclear material. Volume detectors are fixed systems that detect SNM within the volume of the detectors.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.27, "Special Nuclear Material Doorway Monitors"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"
NUREG/CR-0027, "Capability for Intrusion Dectection at Nuclear Fuel Sites"

OTHER DOCUMENTS

1. Messinger, Martin and Charles South, Jr.
Dual Level Exit Search Method for SNM Containment
November 30, 1978 (Working Draft)

   This report describes a dual-level method for SNM exit search that couples a 100% search technique for the one-shot theft attempt and a random search technique for the case of systematic diversion.

DEFINITION

SNM detectors are devices that detect the presence of gamma or neutron emissions indicative of special nuclear material. Walk-through SNM detectors are fixed systems that detect SNM moving through the detection area.

NRC DOCUMENTS

R.G. 5.27, "Special Nuclear Material Doorway Monitors"
R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. Messinger, Martin and Charles South, Jr.
Dual Level Exit Search Method for SNM Containment
November 30, 1978 (Working Draft)

   This report describes a dual-level method for SNM exit search that couples a 100% search technique for the one-shot theft attempt and a random search technique for the case of systematic diversion.

DEFINITION

This area is any place within a facility that is established pursuant to paragraph 70.58(d) (that is, any material balance area or item control area) for the purpose of containing SNM that is not undergoing chemical or physical operations to change its characteristics, is not being prepared for such operations, and is not being packaged.

NRC DOCUMENTS

R.G. 5.26, "Selection of Material Balance Areas and Item Control Areas" (Rev. 1)

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

These procedures are part of a set of standard operational authorization procedures (SOAPs) that are established to prevent unauthorized removal of special nuclear material from the licensee's control. The procedures deal with operational and administrative activities involving both access to SNM and the system of SNM accounting and control.

NRC DOCUMENTS

R.G. 5.49, "Internal Transfers of Special Nuclear Material"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

These procedures are part of a set of standard operational authorization procedures (SOAPs) that are established to prevent unauthorized removal of special nuclear material from the licensee's control. The procedures deal with operational and administrative activities involving both access to SNM and the system of SNM accounting and control.

NRC DOCUMENTS

R.G. 5.49, "Internal Transfers of Special Nuclear Material"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

These procedures are part of a set of standard operational authorization procedures (SOAPs) that are established to prevent unauthorized removal of special nuclear material from the licensee's control. The procedures deal with operational and administrative activities involving both access to SNM and the system of SNM accounting and control.

NRC DOCUMENTS

R.G. 5.57, "Shipping and Receiving Control of Strategic Special Nuclear Material"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

These procedures are part of a set of standard operational authorization procedures (SOAPs) that are established to prevent unauthorized removal of special nuclear material from the licensee's control. The procedures deal with operational and administrative activities involving both access to SNM and the system of SNM accounting and control.

NRC DOCUMENTS

R.G. 5.57, "Shipping and Receiving Control of Strategic Special Nuclear Material"
R.G. 5.14, "Use of Observation (Visual Surveillance) Techniques in Material Access Areas"
R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

This is circuitry configured to detect unauthorized manipulation of safeguards components. It includes line supervisory circuitry on data transmission lines and switches used to sense the removal of equipment cover plates.

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"
R.G. 5.44, "Perimeter Intrusion Alarm Systems" (Rev. 1)
NUREG/CR-0510, "Duress Alarms for Nuclear Fixed Site Facilities"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection, procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

2. **Safeguards Control and Communication Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 78-1785, September 1978

   This handbook provides guidelines for (1) identifying and implementing safeguards control and communication system functions and (2) evaluating existing commercial systems.

DEFINITION

A tamper-indicating seal is a device which, when fastened to a closure, cannot be opened without destroying or breaking the device. These devices usually consist of paper, plastic strips, or fine metal wires. Inspection of these seals determines the state of the seal and hence possible tampering.

NRC DOCUMENTS

R.G. 5.15, "Security Seals for the Protection and Control of Special Nuclear Material"
R.G. 5.10, "Selection and Use of Pressure-Sensitive Seals on Containers for Onsite Storage of Special Nuclear Material"
R.G. 5.57, "Shipping and Receiving Control of Strategic Special Nuclear Material"
NUREG/CR-0543, "CAS and SAS Planning Document"

OTHER DOCUMENTS

1. **Military Specifications - Seals, Self-Locking**
   Naval Construction Battalion Center
   Port Hueneme, CA 93043
   MIL-S-23769B, December 1975

   This report provides military specifications for self-locking seals.

2. Campbell, James W.
   Electronic Self-Monitoring Seal
   Sandia Laboratories, Albuquerque, NM 87185
   SANDIA, 1978

   This document describes a new type of security seal that allows continuous verification of the seal's identity and status through the use of a fiber optics loop.

DEFINITION

Team zoning is a form of work rule design that groups employees and compartmentalizes a facility so that each group works in an area only as part of a team and so that the same team cannot work together in other areas.

NRC DOCUMENTS

NUREG/CR-0532, "Safeguards Against Insider Collusion" (Volume I)

OTHER DOCUMENTS

1. J. Glancy et al.
   Analysis of Nuclear Fuel Facility Safeguards Threats Involving Insider Collusion
   Science Applications, Inc., P.O. Box 2351,
   1200 Prospect St., La Jolla, CA 92037
   SAI-78-547-LJ, April 1978

   This report describes a methodology for analyzing the insider collusion threat and suggests ways to minimize that threat.

DEFINITION

An uninterruptible power system is any power source that protects a critical load from fluctuations or interruptions of the incoming AC power that drives it.

NRC DOCUMENTS

NUREG/CR-0509, "Emergency Power Supplies for Physical Security Systems"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

A vault is a windowless enclosure with walls, floor, roof and doors designed and constructed to delay penetration from forced entry.

NRC DOCUMENTS

NUREG/CR-1378, "Hardening Existing SSNM Storage Facilities"

OTHER DOCUMENTS

1. **Guide for Security Equipment**
   Office of Naval Intelligence, ONI-CS-63-1-76
   July 1975

   This report provides guidance and technical assistance for selecting and using security equipment to protect classified material.

2. **Dept. of Transportation Physical Security Manual**
   Dept. of Transportation, DOT 1600.26, November 1977

   This manual provides guidance to those directly or indirectly responsible for the development and maintenance of the physical security program at DOT facilities, serves as an aid and reference source in selecting and using security-control measures, and establishes basic standards and criteria for the procurement and use of security equipment.

3. **Physical Protection Standards**
   U.S. Coast Guard (G-OIS/74), CG-468, December 1977

   This report establishes Coast Guard Standards for the protection of installations, property, information, and personnel.

4. **Physical Security Standards for Sensitive Compartmented Information Facilities**
   Defense Intelligence Agency, ATTN: DS-4C
   Washington, D.C., DIAM 50-3, July 1974

   This report establishes standards for the protection of sensitive information. It describes methods of protection designed to prevent or detect attempted forced or surreptitious entry and a means of apprehending the intruder before he can remove the sensitive information or perform an unauthorized act.

DEFINITION

Vibration sensors are intrusion-detection devices that signal an alarm when stimulated by vibration of structural material to which they are attached (e.g., vibration caused by cutting into a wall or breaking of a window pane).

NRC DOCUMENTS

NUREG-0320, "Interior Intrusion Alarm Systems"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

OTHER DOCUMENTS

1. **Intrusion Detection Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 76-0554, November 1977

   This handbook provides information on selection procurement, test, and maintenance of intrusion-detection systems. It is the most comprehensive of any publication on such systems.

DEFINITION

This topic concerns methods used in the search of packages for the presence of contraband such as explosives, weapons, or tools that may be used to aid theft or sabotage.

NRC DOCUMENTS

NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

This topic concerns methods used in the search of vehicles for the presence of contraband such as explosives, weapons, or tools that may be used for the purpose of sabotage.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

None were identified during the course of this project.

DEFINITION

This topic concerns walls for security areas.

NRC DOCUMENTS

NUREG/CR-1378, "Hardening Existing SSNM Storage Facilities"
NUREG/CR-0543, "CAS and SAS Planning Document"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. Moore, R. T.
   Penetration Resistance Tests of Reinforced Concrete Barriers
   Institute for Computer Sciences and Technology
   NBSIR 3-101, December 1972

   This report describes the results of a series of penetration tests on six concrete slabs.

3. Moore, R. T.
   Penetration Tests on J-SIIDS Barriers
   Institute for Computer Sciences and
   Technology, NBSIR 73-223, June 1973

   This report describes the results of penetration tests made on three arms rooms. The purpose of the tests was to determine the penetration time, to record the acoustic, ultrasonic and vibrational disturbance, and to ascertain how well the installed alarm sensors detected the disturbance.

4. Moore, Raymond T.
   Barrier Penetration Tests
   National Bureau of Standards, NBS Technical
   Note 837, June 1974

   This note reports the results of penetration tests of sixteen structural barriers to determine their resistance to forcible penetration.

5. Moore, R. T.
   DNA/NBS/CRANE NAD Barrier Tests
   National Bureau of Standards, NBSIR 74-528
   July 1974

   This document reports test results of the penetration resistance of various foreign materials.

80. Weapons
- Handgun
- Semiautomatic
- Shotgun

DEFINITION

Self-explanatory

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. R. C. Dobbyn et al.
An Evaluation of Police Handgun Ammunition: Summary Report
National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, USDOJ, LESP-RPT-0101.01
October 1975

This report describes a study of the terminal effects of police handgun ammunition.

DEFINITION

The hand-held weapons detector is a hand-operated metal detector that is intended to indicate the presence of metal in packages for the purpose of detecting weapons.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
Tests of Hand-Held Metal Weapon Detectors
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice,
LESP-RPT-0603.00, March 1977

   This document reports the results of tests performed on numerous hand-held metal detectors in accordance with Standard NILECJ-STD-0602.00.

2. Caplan, G. M.
Hand-Held Metal Detectors for Use in Weapons Detection
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
NILECJ-STD-0602.00, October 1974

   This study contains performance requirements and test methods for hand-held metal detectors used for determining the location of metal weapons on a person. The standard also applies to detectors that can be hidden on an operator's body.

3. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A hand-held weapons detector is a portable detector that can indicate the presence of metal characteristic of a weapon being carried by an individual.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"

OTHER DOCUMENTS

1. Law Enforcement Assistance Administration
Tests of Hand-Held Metal Weapon Detectors
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, LESP-RPT-0603.00, March 1977

   This document reports the results of tests performed on numerous hand-held metal detectors in accordance with Standard NILECJ-0602.00.

2. Caplan, G. M.
Hand-Held Metal Detectors for Use in Weapons Detection
National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0602.00, October 1974

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SRI International for Sandia Laboratories
Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A volume weapons detector is a fixed system capable of detecting metal characteristic of a weapon anywhere within its volume.

NRC DOCUMENTS

R.G. 5.7, "Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas"
R.G. 5.43, "Plant Security Force Duties"
NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0027, "Capability for Intrusion Detection at Nuclear Fuel Sites"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

2. Law Enforcement Assistance Administration
   Standards for Walk-Through Metal Detectors for Use in Weapons Detection
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   NILECJ-STD-0601.00, June 1974

   This standard contains performance requirements and test methods for walk-through metal detectors. These detectors indicate the presence of metal in excess of a preselected amount on a person passing through a specific space.

3. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

A walk-through weapons detector is a fixed system that detects metal indicative of weapons when it is introduced within the electromagnetic field generated by a detector.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussions of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

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   Standards for Walk-Through Metal Detectors for Use in Weapons Detection
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice
   NILECJ-STD-0601.00, June 1974

   This contains performance requirements and test methods for walk-through metal detectors. These detectors indicate the presence of metal in excess of a preselected amount on a person passing through a specific space.

3. Ellis, J. F.
   Development of Highly Sensitive Metal Detector
   Oak Ridge Y-12 Plant, P.O. Box Y, Oak Ridge, TN 37830, Y-DA-6162, June 1975

   This paper discusses work on a prototype of an active walk-through metal detector developed at Y-12.

4. **Generic Data Base for Modeling Safeguards Security Equipment, Vol. II**
   SRI International for Sandia Laboratories
   Sandia Contract No. 058748, August 1978

   This volume contains amassed generic data that characterize the various classes and types of security equipment that could be used in safeguards programs under the jurisdiction of the Nuclear Regulatory Commission.

DEFINITION

This topic concerns windows and associated hardware for security areas.

NRC DOCUMENTS

NUREG/CR-0543, "CAS and SAS Planning Document"
NUREG-0464, "Site Security Personnel Training Manual"

OTHER DOCUMENTS

1. **Barrier Technology Handbook**
   Sandia Laboratory, Albuquerque, NM 87185
   SAND 77-0777, November 1977

   This handbook defines the role of barriers in a physical protection system by providing a central source of penetration times for barriers, establishing limits for the state of the art, and defining concepts for upgrading barriers and advanced concepts for new or replacement barriers.

2. Lorman, William R.
   Assessment of Various Constructional Materials as Armor for Protecting USN Shore Facilities Exposed to Small-Arms Fire (U)
   Naval Facilities Engineering Command, CEL-TR No. N-1509, December 1977

   This report quantifies the minimum thicknesses and corresponding weights and costs per square foot of surface areas required of various homogeneous and composite armors to defeat high-velocity low-mass ballistic rounds fired at a nominal 25-yard range. Thus, the structural engineer can select relatively low-cost materials (metallic, polymeric, and glass and inorganic nonmetallic) for use in such construction.

3. Warren, G. E.
   Bullet Resistant Window Configuration for Multiple Shots -- Test Results
   Naval Facilities Engineering Command, CEL-TM No. M-78-51-07, December 1977

   This report contains the results of a ballistics test made on several specimen window configurations. The windows were subjected to multiple rounds from a 7.62 mm weapon at a distance of 9.1 meters.

4. Warren, G.
   Transparent Glazing Materials Subjected to 30-Cal. Small-Arms Fire
   Civil Engineering Laboratory, Port Hueneme, CA
   CEL Special Report 51-76-01, September 1975

   This report provides the results of an evaluation of the ballistics resistance of commercially available "bullet-resistant" transparent glazing materials.

DEFINITION

This system involves the use of X-ray equipment for nondestructive inspection of packages or containers. The X-ray system is composed of a radiation source, an imaging and detection system, and a means of alerting the operator to the presence of weapons or other contraband.

NRC DOCUMENTS

NUREG-0464, "Site Security Personnel Training Manual"
NUREG/CR-0484, "Vehicle Access and Control Planning Document"
NUREG/CR-0485, "Vehicle Access and Search Training Manual"

OTHER DOCUMENTS

1. **Entry-Control Systems Handbook**
   Sandia Laboratories, Albuquerque, NM 87185
   SAND 77-1033, September 1977

   This handbook contains general entry-control philosophy and concepts for various applications. It also provides theoretical discussion of operating principles of various elements of an entry-control system and a discussion of those elements, including operating characteristics and test results where available.

2. Law Enforcement Assistance Administration
   NILECJ Standard for X-Ray Systems for Bomb Disarmament
   National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice,
   NILECJ-STD-0603.00, May 1975

   This report contains requirements and test methods for portable X-ray systems used in bomb-disarming operations.

PART II

GENERAL

NRC DOCUMENTS

REGULATORY GUIDES

5.7	Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas
5.10	Selection and Use of Pressure-Sensitive Seals on Containers for Onsite Storage of Special Nuclear Material
5.12	General Use of Locks in the Protection and Control of Facilities and Special Nuclear Material
5.14	Use of Observation (Visual Surveillance) Techniques in Material Access Areas
5.15	Security Seals for the Protection and Control of Special Nuclear Material
5.20	Training, Equipping, and Qualifying of Guards and Watchmen
5.26	Selection of Material Balance Areas and Item Control Areas (Revision 1)
5.27	Special Nuclear Material Doorway Monitors
5.43	Plant Security Force Duties
5.44	Perimeter Intrusion Alarm Systems (Revision 1)
5.49	Internal Transfers of Special Nuclear Material
5.55	Standard Format and Content of Safeguards Contingency Plans for Fuel Cycle Facilities
5.57	Shipping and Receiving Control of Strategic Special Nuclear Material

All Regulatory Guides are available for purchase from the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Technical Reports

Report Number	
NUREG-0178	Basic Considerations for Assembling a Closed-Circuit Television System
NUREG-0320	Interior Intrusion Alarm Systems
NUREG-0464	Site Security Personnel Training Manual (4 Volumes)
NUREG/CR-0027	Capability for Intrusion Detection at Nuclear Fuel Sites
NUREG/CR-0484	Vehicle Access and Control Planning Document
NUREG/CR-0485	Vehicle Access and Search Training Manual
NUREG/CR-0509	Emergency Power Supplies for Physical Security Systems
NUREG/CR-0510	Duress Alarms for Nuclear Fixed Site Facilities
NUREG/CR-0532	Safeguards Against Insider Collusion (Volume 1)
NUREG/CR-0543	Central Alarm Station and Secondary Alarm Station Planning Document
NUREG/CR-0591	Current Usage of Containers for SNM Storage, Transfer, and Measurement
NUREG/CR-1327	Security Lighting Planning Document
NUREG/CR-1378	Hardening Existing SSNM Storage Facilities

All NUREG and NUREG/CR reports are available for purchase from the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and the National Technical Information Service, Springfield, VA 22161.

OTHER DOCUMENTS

ACTIVE NIGHT VISION DEVICES, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0305.00, June 1975.

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AN ADAPTIVE, DIRECTIONAL TWO-PHONE SEIMIC DETECTION SYSTEM, T. S. Edrington, Sandia Laboratories, Albuquerque, N. Mex., SC-RR-72-0126, March 1972.

ALARM SIGNAL TRANSMISSION CONCEPTS, Sigmund Scala, Stanford Research Institute, Menlo Park, Calif., SDD-TN-111, April 1975.

ANALYSIS AND COMPARISON OF TRANSPORTATION SECURITY SYSTEMS, R. L. Rinne, Sandia Laboratories, Albuquerque, N. Mex., SAND-76-8660, May 1976.

ANALYSIS OF THE EXPLOSIVE DETECTION K9/HANDLER TEAM EVALUATION, Robert F. Lally, Director, DOT-FAA-Civil Aviation Security Service - ACS-1, ACS-200, June 16, 1975.

ANALYSIS OF THE FY76 EXPLOSIVE DETECTION K9 TEAM EVALUATIONS, Robert F. Lally, Director, DOT-FAA-Civil Aviation Security Service - ACS-1, ACS-200, July 29, 1976.

ANALYSIS OF THE FY77 EXPLOSIVE DETECTION K9 TEAM EVALUATIONS, Robert F. Lally, Director, DOT-FAA-Civil Aviation Security Service - ACS-1, ACS-200, June 17, 1977.

ANALYSIS OF NUCLEAR FUEL FACILITY SAFEGUARDS AGAINST THREATS INVOLVING INSIDER COLLUSION, J. Glancy, et al., Science Applications, Inc., P.O. Box 2351, 1200 Prospect Street, La Jolla, Calif., SAI-78-547-LJ, April 3, 1978.

APPLICATION OF NUCLEAR MAGNETIC RESONANCE TECHNIQUES TO THE DETECTION OF EXPLOSIVES, King, Rollwitz, Gonand, University of Kentucky, Lexington, Ky., Carnahan Conference on Crime Countermeasures, BU No. 115, 1978 Proceedings.

ASSESSMENT OF VARIOUS CONSTRUCTIONAL MATERIALS AS ARMOR FOR PROTECTING USN SHORE FACILITIES EXPOSED TO SMALL-ARMS FIRE (U), William R. Lorman, Civil Engineering Laboratory, Port Hueneme, Calif., CEL-TN No. N-1509, December 1977.

ATTACK AND BULLET RESISTANT SECURITY DOOR ASSEMBLIES, John L. Squier and Kenneth O. Gray, Civil Engineering Laboratory, Port Hueneme, Calif., CEL-TM No. 61-78-9.

ATTACK RESISTANCE OF STRUCTURAL COMPONENTS, J. E. Tancreto, Civil Engineering Laboratory, Port Hueneme, Calif., Tech. Note N-1425, February 1976.

ATTACK RESISTANT FRANGIBLE ROOF CONCEPTS – PRELIMINARY TESTS, Robert J. Odello Civil Engineering Laboratory, Port Hueneme, Calif., CEL-TM 51-78-04, November 1977.

ATTACK-RESISTANT WALLS – EXPLOSIVE TESTS, Robert J. Odello, Civil Engineering Laboratory, Port Hueneme, Calif., CEL-TN No. N-1510, December 1977.

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AUTOMATED IDENTIFICATION METHODS, George H. Warfel, Security Management, American Society for Industry Security, 2000 K Street, Washington, D.C., Vol. 22, No. 6, June 1978.

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AUTOMATIC VEHICLE LOCATION TECHNIQUES FOR LAW ENFORCEMENT USE, R. L. Fey, Electromagnetics Division, NBS, National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, LESP-RPT-0205.00, September 1974.

THE BALLISTIC RESISTANCE OF POLICE BODY ARMOR, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0101.01, May 1978.

BARRIER PENETRATION DATA BASE, Anthony Fainberg and Alan M. Bieber, Jr., Technical Support Organization, Brookhaven National Laboratory, Upton, New York, May 1978.

BARRIER PENETRATION TESTS, Raymond T. Moore, National Bureau of Standards, Washington, D.C., NBS Technical Note 837, June 1974.

BARRIER TECHNOLOGY HANDBOOK, Sandia Laboratory, Albuquerque, N. Mex., SAND-77-0777, November 1977.

BATTERIES FOR PERSONAL/PORTABLE TRANSCEIVERS, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, NILECJ-STD-0211.00, June 1975.

BATTERIES USED WITH LAW ENFORCEMENT COMMUNICATIONS EQUIPMENT, R. L. Jesch and I. S. Berry, Electromagnetics Division, NBS, National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, LESP-RPT-0201.00, May 1972.

BATTERIES USED WITH LAW ENFORCEMENT COMMUNICATIONS EQUIPMENT, W. W. Scott, Jr., Electromagnetics Division, NBS, Boulder, Colo., National Institute of Law Enforcement and Criminal Justice, U.S. Department of Justice, LESP-RPT-0202.00, June 1973.

BILEVEL ALARM MONITORING MULTIPLEXER, Charles S. Johnson, TM Development Division 9421, Sandia Laboratories, Albuquerque, N. Mex., SAND-77-0605, June 1977.

BULLET RESISTANT WINDOW CONFIGURATION FOR MULTIPLE SHOTS–TEST RESULTS, G. E. Warren, Civil Engineering Laboratory, Port Hueneme, Calif., CEL-TM No. M-78-51-07, December 1977.

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BURIED LINES SENSOR EVALUATION FOR BISS (TEST PLAN) PART I.–LINE SENSORS AND EVALUATION PHILOSOPHY, O. Chambers, R. Allen, A. Desens, J. Martin, University of Kentucky, Lexington, Ky., BU No. 105, Carnahan Conference on Crime Countermeasures, 74 Proceedings.

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A bibliography of technical references covering physical security systems, components, and procedures was prepared to provide Nuclear Regulatory Commission licensees a listing of available documents that could be used by licensees to select systems, components, and procedures to meet the revised physical protection requirements of 10 CFR Part 73 (Physical Protection Upgrade Rule).

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