NUREG-0627
Appendix A

A Safeguards Case Study of the Nuclear Materials and Equipment Corporation Uranium Processing Plant Apollo, Pennsylvania (U)

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W. Altman, J. Hockert, E. Quinn

Performed at the Request of
The Honorable Morris K. Udall, Chairman
Committee on Interior and Insular Affairs
U.S. House of Representatives

Office of
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INTRODUCTION

Introduction

This appendix of the report on safeguards at NUMEC/APOLLO in the mid-1960's discusses the physical protection program for the NUMEC Uranium Plant. Section 1 of this report provides a brief summary of the security requirements imposed upon NUMEC under the terms of its contracts involving AEC furnished special nuclear material. Sections 2 through 10 of the appendix present a reconstruction of the physical protection program implemented at the NUMEC Uranium Plant in the spring of 1964. To assist the reader in comparing this program with current requirements, a parallel discussion of the physical protection measures implemented at the Babcock and Wilcox Uranium Plant during 1977 (Ref. 1) is also presented in those sections.

In reconstructing the NUMEC physical protection program, documents dating from as early as 1961 to as late as 1973 were used as primary sources. While great care was taken in interpreting these documents, certain assumptions were required to reconstruct the physical protection program. These included assumptions that significant changes in the program would be documented in inspection reports and surveys, that procedures to which NUMEC committed itself in correspondence with the AEC were, in fact, followed (unless the survey or inspection reports stated otherwise), and that all existing relevant documents were made available for this review. The reconstruction of the physical protection program presented is only as accurate as these assumptions. It was particularly difficult to document the absence of specific procedures or physical protection measures. This was usually accomplished by deduction from one or more of the following:

(1) a survey or inspection report dated after 1964 recommended that the specific procedure or physical protection measure be implemented; (2) documentation of procedures or measures which are consistent with the existence of the specified procedure or physical protection measure; (3) documentation of procedures or measures which would be unnecessary given the existence of the specific procedure or measure; (4) documentation indicating that the plant layout or security post locations and manning would preclude effective use of the specific procedure or measure; or (5) absence of any reference in the documents. In most cases in which physical protection procedures or measures were stated to be absent, more than one of these types of evidence was relied upon. In no case was criterion (5) the sole reason for concluding that a specific physical protection measure was absent. Nevertheless, such statements are somewhat conjectural.

While the discussion of the 1977 physical protection measures can serve as a useful guide to current physical protection requirements, it should be noted that the safeguards comprehensive evaluation conducted at the B&W Apollo facility during the fall of 1977 recommended

that safeguards in place at that time be strengthened. (A report detailing the deficiencies found (Ref. 2) was transmitted to Congressman Udall.) Because the B&W high-enriched uranium production activities were terminated before the recommendations of the safeguards comprehensive evaluation could be implemented, the discussion of the current (1977) physical protection measures does not fully reflect current 1979 NRC requirements.

Nevertheless, it was felt that the changes in the 1977 physical protection measures required to implement the recommendations of the safeguards comprehensive evaluation were sufficiently minor, in comparison to the change in the physical protection program between 1964 and 1977; that the physical protection measures could still serve as a useful guide to current physical protection requirements.

SECTION 1 - SECURITY REQUIREMENTS

1.0 Security Requirements

This section of the report describes the security requirements under which the NUMEC Uranium Plant operated in the spring of 1964. Although the AEC regulations in effect at this time did not impose physical security requirements, the material which NUMEC received under AEC contract was subject to the security requirements for strategically important special nuclear materials contained in the AEC Manual Chapter 2401 (AECM 2401). Since the NUMEC Uranium Plant operations involved classified documents and materials, it was subject to certain other sections of AECM 2401. On October 1, 1964, the AEC revised its instructions to eliminate the application of the security requirements on licensees possessing unclassified strategically important special nuclear material under contracts or subcontracts when they were financially responsible for losses (Ref. 3). However, a special inspection of NUMEC conducted in 1966 indicated that the NUMEC uranium plant security still met all the requirements of AECM 2401 for unclassified strategically important special nuclear material (Ref. 14).

Although AECM 2401 set security standards, AEC Operations Office Managers were responsible for interpreting the manual and were empowered to exempt facilities from specific requirements (Ref. 4). Therefore, there may have been some differences between the precise security standards applied to the NUMEC Plant and those presented in this section of the report which is based strictly upon the requirements of the AECM 2401, which applied to facilities with NUMEC's level of security interests.

1.1 Security Requirements for Strategically Important Special Nuclear Material

Special Nuclear Material (SNM) was grouped into three categories for the purpose of determining the level of physical protection required (Ref. 5). The security category of the SNM was determined by the form of the material and the quantity contained of Uranium-235, Uranium-233, or plutonium. Three different forms of material were defined, based upon their accessibility for use as nuclear explosives. These forms were defined as follow (Ref. 5):

Accessible Form - Material is considered to be in accessible form when it is ready for immediate use as nuclear explosives or can be prepared for such use by comparatively simple metallurgical, chemical, or mechanical processing steps. Examples are: plutonium and Uranium-233 as unalloyed metal, and enriched (U-235/U ratio 20% or more by weight) uranium as unalloyed metal, uranium tetrafluoride or uranium hydride.

Workable Form - Material is considered to be in workable form when it is capable of being used as nuclear explosives after a series of difficult metallurgical, chemical, or mechanical processing steps. Examples are: alloys and pure compounds of plutonium, uranium-233, and enriched (U-235/U ratio 20% or more by weight) uranium, except uranium tetrafluoride and uranium hydride, and unirradiated fuel elements.

Inaccessible Form - Material is considered to be in inaccessible form when the radiation field therefrom is in excess of 5R per hour at a distance of one meter, when the U-235/U ratio of enriched uranium is less than 20% by weight, or when the total Pu, U-233 and U-235 constitutes less than 5% by weight of a gross mixture from which it is not separable by mechanical means, or must go through very complex metallurgical, chemical, or mechanical processing steps, requiring utilization of considerable plant and equipment, for use as nuclear explosives. Examples are: irradiated material, impure metal or compounds, mixtures and residues including combustible wastes, sludges, slurries and contaminated solutions.

Special nuclear material was assigned to security groups in accordance with its form, material type, and quantity as shown in Table A-1. The minimum physical protection requirements for each security group are shown in Table A-2 (Ref. 5).

Table A-1

ASSIGNMENTS OF SNM TO SECURITY GROUPS

MATERIAL TYPE[1]	SECURITY GROUP 1	SECURITY GROUP 2	SECURITY GROUP 3	SECURITY EXEMPT[2]
Plutonium or Uranium - 233	Over 1 kg - accessible _____	_____ Over 30 kg - workable	200 gm to 1 kg - accessible 5 kg to 30 kg - workable	Under 200 gm - accessible Under 5 kg - workable
Over 80% enriched Uranium	Over 5 kg U-235 - accessible _____	_____ Over 75 kg U-235 - workable	1 kg to 5 kg U-235 - accessible 15 kg to 75 kg U-235 - workable	Under 1 kg U-235 - accessible Under 15 kg U-235 - workable
50% to 80% enriched Uranium	_____ _____	Over 15 kg U-235 - accessible Over 250 kg U-235 - workable	5 kg to 15 kg U-235 - accessible 30 kg to 250 kg U-235 - workable	Under 5 kg U-235 - accessible Under 30 kg U-235 - workable
20% to 50% enriched Uranium	_____ _____	_____ _____	Over 15 kg U-235 - accessible Over 50 kg U-235 - workable	15 kg U-235 or less - accessible 50 Kg U-235 or less - workable

1) Unclassified materials - classified materials were protected in accordance with their classification level or security group, whichever was more stringent.

2) Material of all types in inaccessible form also falls into this group.

Table A-2

MINIMUM PHYSICAL PROTECTION REQUIREMENTS FOR SECURITY GROUPS

SITUATION	SECURITY GROUP 1	SECURITY GROUP 2	SECURITY GROUP 3
In Storage(1)	Continuous armed guard control; or combination locked repositories, or apparatus or equipment offering equivalent protection, located in areas under hourly armed guard patrol or automatic alarm protection.	Key locked repositories under automatic alarm protection or in security areas subject to hourly guard patrol, or in securely locked buildings located in guarded security areas or subject to alarm protection or periodic guard patrol, or in open storage in securely locked and separately fenced security areas subject to periodic guard patrol.	Combination locked repositories, securely locked building, or open storage in securely locked and separated fenced areas.
In Use (2)	Within a limited security area, under conditions assuring that unauthorized persons could not remove, undetected a strategic quantity (Security Group 3 or greater) from the area.	Within an area to which access is permitted only to authorized persons and materials are so controlled as to safeguard strategic quantities (Security Group 3 or greater) from theft or diversion.	Under the control of a designated custodian in an area or location where a custodian or supervisor can safeguard the material from theft or diversion.
In Transit(3)	In custody of an armed escort.	Registered mail, railway or air express Armed Surveillance Service, sealed van service with L cleared vehicle operators or in custody of escort.	Certified mail, railway express Recorded Tally Service, railway or air express Protective Signature service, air lines "Signature Service," sealed freight car or van service, or in custody of escort.

Table A-2
(continued)

(1) Guards must have "L" clearance.

(2) Custodians and accountability representatives must have "L" clearances.

(3) Escorts must have "L" clearances.

1.2 Security Requirements for The NUMEC Uranium Plant Classified Interests

NUMEC was required to implement the following security measures to ensure protection of AEC classified security interests (Ref. 4).

1.2.1 Physical Barriers

Since the NUMEC Uranium Plant was a security area, it was required to be surrounded by physical barriers meeting the following minimum standards (Ref. 4):

a. Permanent fences utilized for the protection of security areas shall be of No. 11 gauge or heavier wire mesh so woven or tied that openings cannot be easily expanded and do not readily provide foothold for scaling; shall be topped by 3 strands of barbed wire on brackets angled outward, where possible, and shall extend to within 2 inches of firm ground or below the surface if the soil is unstable and subject to erosion by wind or water. Overall height shall be no less than 8 feet. Fences shall be mounted on metal posts of appropriate height set in concrete with additional bracing as necessary at corners and gate openings. Posts, bracings, and other structural members shall be inside the area and gate hardware so affixed as to make removal extremely difficult.

b. Temporary fences utilized for protection of security areas shall be of any height or material which will effectively impede access to the area for the period of restriction.

c. Permanent security fencing shall, where property lines, location of buildings and other structures permit, be located not less than 50 feet or more than 150 feet from the building or object of protection and be so arranged that there is, if practicable, at least 20 feet of clearance between it and structures, parking areas or other objects outside the area which might afford concealment of potential intruders.

d. Walls, floors, and roofs serving as physical barriers shall be of such construction that, as a minimum, they will afford protection equivalent to fencing specified in "a" above.

e. Unattended openings in barriers (doors, gates, ducts, tunnels, sewers, culverts, windows) more than 96 square inches in area and over 6 inches in smallest dimension shall be alarmed or equipped with bars, mesh, or grille work, locked if

necessary, which will provide protection comparable to that afforded by the barrier itself when located less than:

1. 18 feet above uncontrolled ground, roofs, or ledges;

2. 14 feet diagonally or directly opposite windows, fire escapes, roofs or other openings in uncontrolled buildings;

3. 6 feet from uncontrolled openings in the same barrier which are accessible from open areas.

1.2.2 Personnel Identification

Since the NUMEC Uranium Plant was a security area, the NUMEC security program was required to include a personnel identification system meeting the following standards (Ref. 4).

1.2.2.1 Utilization

Identification badges shall be conspicuously worn by all individuals (both employees and visitors) within security areas.

1.2.2.2 Types of Badges or Passes

a. Permanent Employees

1. Identification devices for permanent employees shall contain the name and clear photograph of the employee. The dimensions of the photograph, exclusive of the name, shall not be less than 1-1/2" long by 1-1/4 " wide, and the facial image shall be as large as practicable within these limits. If color photographs are used, care must be taken to assure true coloring.

2. Additional information or data may be included, such as a serial number, the personal description and signature of the holder, the signature (or facsimile) of the official authorizing issuance, and coding, when required, to indicate the areas of the facility and classification or categories of information to which the holder is authorized access. The specific clearance status of the holder may be shown only on badges which are not removed from the facility. It shall not be shown by the letters "Q," "L," "TS," "S," or "C," or the words "Top Secret," "Secret," or "Confidential" on passes or badges removed from the facility but may be indicated, if desired, by color or symbol coding.

b. Visitors

Identification devices for visitors shall bear, as a minimum, the following data:

1. For escorted visitors: a serial number and indication, on the face of the device, that escort is required;

2. For unescorted visitors: the name of the visitor, type of security clearance, physical area visitor is permitted to enter, and expiration date. Unescorted visitor badges not removed from the facility need show only a serial number and type of security clearance or areas to which visitor is permitted access.

c. Construction Workers and other employees whose work is so located or whose movements are so controlled that they are not permitted access to Restricted Data or other classified matter may be issued badges containing only the name of the employer or issuing authority and a number conspicuously displayed on the face thereof.

1.2.2.3 Specification for Manufacture and Procurement of Badges or Passes

a. Badges or passes issued to permanent employees for access to security areas shall meet the following requirements: (Ref. 4)

1. Printed inserts shall be placed between sheets of transparent plastic material in such a manner that under heat and pressure the plastic becomes securely bonded together and effectively resists alteration of the insert.

2. Inserts shall be of paper, metal, or plastic and shall have intricate background designs which are difficult to produce by normal photocopying.

3. The face of the insert or bonding material shall contain an ink or dye which is noticeably affected by such heat, erasures or solvent as would be necessary to relaminate or alter the pass or badge. (Other features such as fluorescent inks or dyes, magnetized matter, vinyl base inks, watermarks (if paper), superimposed cross-threads or wires, or other features aid in preventing alterations or forgery of the pass or badge.)

4. Care shall be taken in the procurement of badge or pass inserts to assure adequate accountability of plates, inserts, scrap and spoilage.

b. Badges issued to construction workers or other employees not requiring access to Restricted Data or other classified matter may be of plastic, metal, celluloid or other substantial material.

c. All badges shall be equipped with devices, such as pins or clips, or plastic badge holders issued to facilitate wearing the badge upon the person.

1.2.2.4 Records shall be maintained of all badges or passes made, issued, lost, recovered or returned. Such records shall include date of issuance, pertinent identifying data, areas or degree of access authorized, and clearance status of the holder. Such data should be available to personnel controlling access to security areas for ready verification of clearance status and operational approval as necessary (Ref. 4).

1.2.2.5 Recovery. Badges and passes shall be recovered from terminating employees. Badges and passes issued to visitors will be recovered at the discretion of the managers of operations (Ref. 4).

1.2.2.6 Lost Badges or Passes. Provision shall be made for the replacement of lost badges or passes and notification to appropriate personnel to prevent unauthorized use (Ref. 4).

1.2.2.7 Reissuance. All badges and passes required for the subsection above shall be replaced by a new issuance of distinctively different design with new photograph not less often than five years or when 5% have been lost, whichever occurs first (Ref. 4).

1.2.2.8 Admittance. Persons controlling admittance to security areas shall be required to determine, by examination of identification or other media, that an individual has appropriate operational and security approvals to enter the area before permitting entry. Visitors possessing appropriate clearance may be admitted to security areas without escort; all other visitors shall be under appropriately cleared escort at all times while within a security area (Ref. 4).

1.2.3 Protective Alarms

1.2.3.1 Use. Protective alarm systems may be used: (Ref. 4)

a. As an aid to armed guards.

b. In lieu of armed guards.

c. To permit the use of less expensive storage equipment (e.g., transfer cases, open shelves, key lock cabinets or other non-security containers) than would be required without alarm protection.

d. In lieu of physical security measures (such as securely locked doors, heavily constructed partitions, frequent patrol or continuous observation by guards, or similar measures) which are precluded by building layout, safety regulations, operating requirements, cost, or other reasons.

1.2.3.2 Basic Requirements. Following are minimum requirements for the installation and operation of automatic alarm systems at AEC facilities: (Ref. 4)

a. When building, rooms, safes, or vaults requiring alarm protection are so located that a visible or audible signal would be immediately detected by protective personnel or operating personnel specifically designated to take required action upon such detection, a local alarm system may be utilized; otherwise, a central station alarm system shall be specified.

b. All alarm equipment and circuits shall be tested daily to assure proper functioning and periodically to assure prompt response by protective personnel.

c. Alarm equipment and circuits shall be inspected at least annually to assure continuing serviceability.

d. An alternate source of power shall be provided to assure the continued operation of the system.

e. Alarm systems or devices selected shall have been approved for the intended use by Underwriters Laboratories, Inc., or shall have had their quality, effectiveness and dependability otherwise satisfactorily demonstrated.

f. Installation of alarm systems or devices shall meet Class "A" standards for such installations as established by Underwriters Laboratories, Inc., and set forth in their publication, "Standard for Installation, Classification and Certification of Burglar Alarm Systems," and, additionally in all cases, the requirement in d, above.

1.2.4 Protective Lighting

Protective lighting was not required for the NUMEC Uranium Plant (Ref. 4).

1.2.5 Guard Force

1.2.5.1 Utilization. A guard force is required at security areas where the security interest cannot be adequately safeguarded during working hours by operating or administrative employees or during non-working hours by an automatic alarm system (Ref. 4).

1.2.5.2 Functions. Guard forces shall perform the following functions, as appropriate: (Ref. 4)

a. enforce the system of personnel identification and control;

b. observe and patrol designated perimeters, areas, structures and activities of security interest;

c. intercept persons or vehicles gaining unauthorized access to security areas;

d. inspect designated repositories, rooms or buildings of security interest during other than normal working hours to determine that they are properly locked or are otherwise in order;

e. report to supervision as a matter of prescribed routine under normal conditions and as necessary in the event of unusual circumstances;

f. perform essential escort duties;

g. enforce the established system of control over the removal of documents or material of security interest from security areas:

h. respond to protective alarm signals or other indications of suspicious activity;

i. act as necessary in the event of situations affecting the security of the facility, including fires, industrial accidents, internal disorders, and attempts to commit espionage, sabotage, or other criminal acts;

j. otherwise generally safeguard data, materials, or equipment against unauthorized access, theft, or intentional damage.

1.2.5.3 Emergency Plans. At all facilities employing guard forces, plans shall be established and maintained to provide protection thereof in the event of strike or walk-out by guard personnel. These plans shall include, as may be required and to the extent available, assistance of city, county or state police organizations (Ref. 4).

1.2.5.4 Efficiency in Use of Manpower. The use of guard forces shall be carefully planned and continuously reviewed to assure the most effective and economical utilization of manpower consistent with security requirements (Ref. 4).

1.2.5.5 Qualifications and Training

a. Physical Qualifications. Guards shall be vigorous and fully capable of performing assigned duties and emergency functions. As necessary, provision shall be made to assure that physical qualification requirements continue to be met after initial employment (Ref. 4).

b. Mental Qualifications. Guards shall be mentally alert and capable of exercising good judgment, understanding and implementing normal instructions and orders, and assimilating necessary specialized training. In addition, guards shall possess courage, tact and resourcefulness (Ref. 4).

c. Training. Each member of a guard force shall successfully complete a course in basic training upon employment and prior to assignment of duty and, thereafter, periodic refresher courses and, as necessary, advanced training. The extent and type of training for guard forces may vary considerably, depending on the importance, size, complexity, layout, functions and other factors of a particular facility. Appropriate subjects for inclusion in guard training courses are: (Ref 4)

1. General orientation.
2. Purposes and principles of the system of security.
3. Security as applied to the local installation.
4. Organization of the guard force.
5. Functions of the guard force.
6. Specific duties of the individual, including sufficient "breaking-in" training.
7. Authority of the individual guard.
8. Guard orders - general and specific.
9. Discipline - obedience to orders.
10. Employee and public relations.
11. Instruction in the use, safe practice, and maintenance of side arms.
12. Weapons qualification and firing on practice courses.
13. Self-defense.
14. Communications facilities and procedures.
15. Elementary first aid and fire protection.
16. Operation and care of motor vehicles.
17. Report writing.
18. Riot control.
19. Traffic control.
20. Operation and use of special equipment.

1.2.5.6 Clearance. Guards shall be "Q" cleared when utilized for protection of a security area containing a security interest classified "Secret" or higher. Guards shall be "L" cleared when utilized for the protection of other security areas (Ref. 4).

1.2.5.7 Equipment:

a. Uniforms. Guard personnel should be distinctively uniformed while on duty and identified with their function by appropriate emblems or badges.

b. Arms and ammunition. All guards while on duty shall be armed with side arms of not less than .38 caliber. Such weapons shall be in serviceable condition, loaded and ready to use at all times. The following is suggested as a guide for armament of a guard force employed at a facility requiring plans for its emergency deployment.

1. One handgun per guard.

2. Small supply of riot shotguns.

3. Supply of tear gas grenades or shells.

4. Limited supply of special weapons for unusual activities and posts, such as:

   (a) short-barrelled handguns for shipment escorts;

   (b) submachine guns for protective work where maximum firepower is needed at short ranges;

   (c) rifles for lookouts, isolated posts or other positions where long range accuracy is a consideration.

5. Small reserve in excess of actual requirements to provide for repairs, variations in strength or other contingency.

1.2.5.8 Orders. General and special orders shall be issued in writing covering each post and assignment. Such orders shall be carefully and clearly worded to include all necessary phases of each assignment. They shall be reviewed at any time a post is changed and in any event not less often than semiannually

to be certain that they are currently applicable. Periodic inspections and examinations shall be conducted to assure thorough understanding of and compliance with all orders (Ref. 4).

1.2.5.9 Supervision of a guard force shall be provided to the extent required to assure proper and adequate performance of guard duties (Ref. 4).

a. Personal Supervision. At facilities where guard forces of several men per shift are engaged there shall be full-time personal supervision.

   1. Each guard shall be inspected by his supervisor upon reporting for duty to determine his apparent physical fitness therefore and the condition and adequacy of his weapon, uniform or other equipment. At such time he shall be given any special instructions or orders which may be necessary.

   2. Each guard post, patrol and other activity shall be personally inspected by supervision at irregular intervals throughout each shift to determine that personnel and the system are functioning properly.

b. Supervision by Other Means. Various means and devices, such as recorded and supervisory tour systems, may be utilized as supplements to personal supervision or, in the case of small facilities or remote areas, to supplant personal supervision as a means of assuring that necessary areas are patrolled and that other functions are performed.

c. Reports to Headquarters. All guard personnel shall report regularly to their headquarters by established means of communication. The frequency of such reports may vary, depending upon the importance, size and complexity of the installation, nature of work, and other factors. Records of tours and reports to headquarters shall be checked carefully. Failure on the part of a guard to record a visit at a designated station, to report to headquarters as required, or other deviation from established reporting procedures shall be investigated immediately.

d. Duty Log. A continuous written record of all guard force activity, including details of any matters or occurrences having a bearing on the security of the facility, shall be maintained for each shift or day and retained for reference for an appropriate period.

1.2.6 Protective Communications

1.2.6.1 Purpose. Protective communication systems serve to integrate guard force activities by providing telephone or radio, enabling communications between: (Ref. 4)

a. fixed points within the facility;

b. fixed points and mobile units within the facility;

c. facility and outside police or fire departments or headquarters of an organization having a support mission at facility.

1.2.6.2 Requirements: (Ref. 4)

a. Facilities employing guard forces shall be provided with a system which will provide both intra-plant and outside communications.

b. Periodic tests of protective communications systems are required to assure proper operating condition.

1.2.7 Security of Matter in Storage

Matter in storage (i.e., matter not in use or not attended by persons concerned with its use) requires safeguarding against theft, espionage, unauthorized access, sabotage or other intentional damage (Ref. 4).

1.2.7.1 Factors Affecting Degree of Protection Required. Classification is the only security factor determining the degree of protection required for documents. An accumulation of Secret documents which as a group are equivalent to Top Secret in sensitivity, shall be protected as Top Secret matter. For matter other than documents, the following additional factors shall be considered: (Ref. 4)

a. Strategic importance;

b. Susceptibility to compromise (matter itself or inherent information);

c. Effect on vital production or delivery schedules if lost from any cause;

d. Peculiar characteristics, including health-safety factors;

e. Replacement cost.

1.2.7.2 Minimum Requirements for Storage Containers.

Storage containers embodying security features and required by the provisions of this chapter shall, as a minimum, conform to the following specifications: (Ref. 4)

a. A safe-type filing cabinet is a three-or four-position combination locked steel cabinet of such size and weight as would minimize the possibility of surreptitious removal.

b. A safe is a burglar resistive cabinet or chest having a body of steel at least 1/2" thick and a three-or four-position combination locked steel door at least 1" thick, exclusive of bolt work and locking devices.

c. A vault is a burglar resistive windowless enclosure having walls, floor, and roof of (a) steel at least 1/2" thick or (b) reinforced concrete or stone at least 9" thick or

(c) non-reinforced concrete or stone at least 12" thick and having a three-or four-position combination locked steel door at least 1" thick, exclusive of bolt work and locking devices.

d. A vault-type room is one provided with door(s) having three-or four-position combination locks and, in addition, protected by an automatic alarm system actuated by any penetration of walls, floors, ceilings or openings, or by motion within the room. (If an alarm system involving the use of foil, tape or wire interlacing of windows or walls is used, such material need not be installed on walls, floors, or ceilings meeting specifications in c., above.)

1.2.7.3 Requirements for Storage

Strategically important special nuclear material shall be stored in accordance with the requirements specified in 1.1 (Ref. 5).

1.2.7.4 Locks required for use on vaults or file cabinets and doors or gates in security area barriers shall be as follows: (Ref. 4)

a. Combination locks shall be three-or four-position dial type, manipulation resistant.

b. Combination padlocks shall be of three-position dial type changeable combinations.

c. Panic locks used on emergency exit doors in building walls which serve as perimeter barriers shall be so installed that doors are operable only from the inside.

d. Key locks in doors or gates in security area perimeters shall be positive in operation and of key cylinder design.

e. Key padlocks on doors or gates in security area perimeters or on shipping containers or vehicles of security significance shall resist unauthorized opening, be of rugged and sturdy construction, and designed for out-of-door use, if necessary.

1.2.7.5 Combinations of locks or padlocks on security containers shall be known only to those authorized access to the matter contained. They shall be changed whenever such equipment is placed in use after procurement; whenever a person knowing the

combination leaves the employ of the person in control of such equipment; whenever the combination has been subjected to compromise; and at least once every year. Records of combinations shall be classified no lower than the highest classification of the matter authorized for the storage in the security container. On the face, or on the inside, of each repository or of each drawer thereof, containing matter classified Confidential or higher, there shall be posted the names, addresses and telephone numbers of persons who have knowledge of the combination, to be called if the repository is found open and unattended after normal working hours. A record of the date of last change of the combination of each repository shall be maintained but shall not be posted on the outside of the repository (Ref. 4).

1.2.7.6 Repositories Found Open. Procedures shall be established to assure that appropriate measures are taken in the event that repositories containing classified matter are found open and unattended after normal working hours (Ref. 4).

1.2.7.7 Keys to locks or padlocks on security containers and doors or gates to security areas shall be safeguarded in a manner which effectively prevents unauthorized use of such keys. In the event that a key is lost, the locks which it opens shall be changed immediately (Ref. 4).

1.2.7.8 Lock Bars, when used, shall be at least 3/8" square in cross section and constructed throughout of medium carbon steel of forge quality or equivalent (Ref. 4).

1.2.7.9 Hasps for use on doors or yokes to secure lock bars on file cabinets shall be secured to the container by welding or rivetting, and hinges on doors used for access to security areas when exposed to the exterior shall be designed or constructed to prevent withdrawal of hinge pins and consequent release of door (Ref. 4).

SECTION 2 - SECURITY AREAS

SECURITY AREAS

(1977)[1]

(1964)

[1] Note: All discussion of 1977 physical protection measures in sections 2 through 10 is from Reference 1.

2.1 Security Areas (U)

(U) By definition, a security area is a physically defined space containing classified matter, and thus, subject to physical protection and personnel access controls.

(U) Classified matter was handled and stored in the office building and in the Uranium Plant (Ref. 6). Each of these, therefore, constitutes a security area.

2.2 Protected Area (U)

(U) By definition, a protected area is any area encompassed by physical barriers and to which access is controlled. There was only one protected area at the Apollo Site; it encompassed the entire Uranium Plant and a fenced shipping and receiving area outside of the north end of the building (Ref. 7).

(U) The 1964 Apollo Site "protected area" is shown on Figure A-2.

NUCLEAR MATERIALS AND EQUIPMENT CORP.

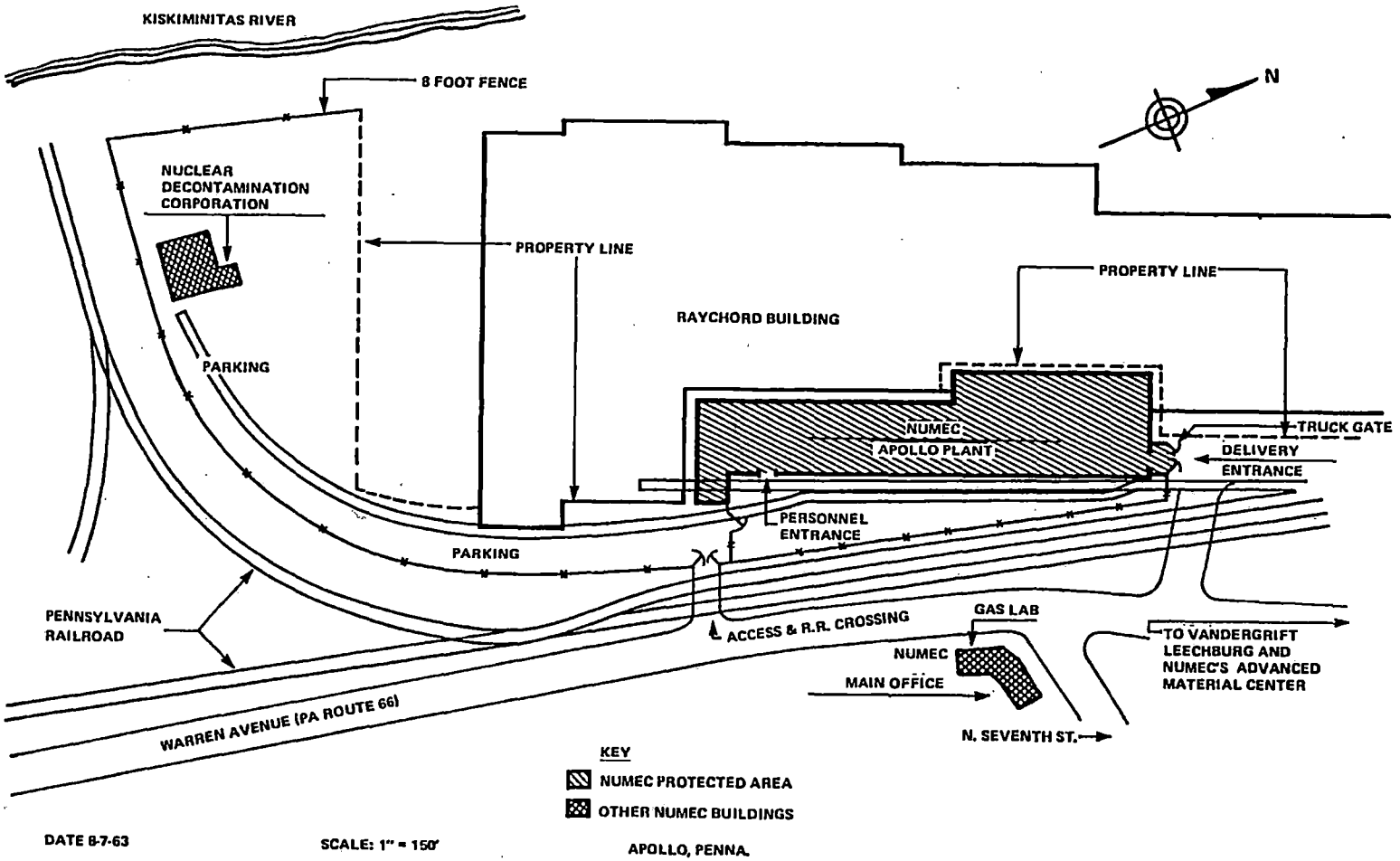
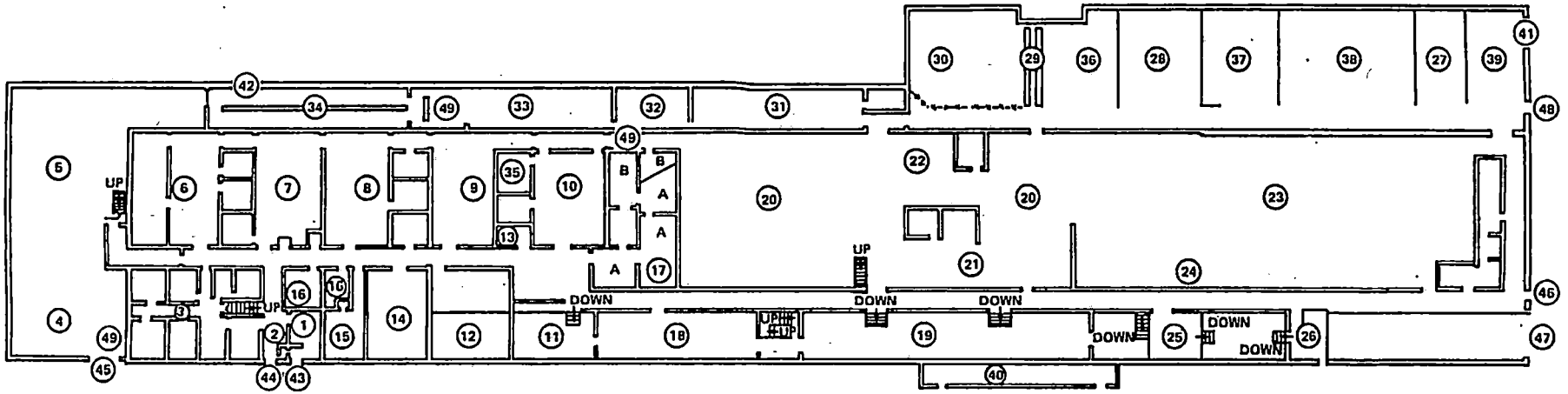


FIGURE A-2

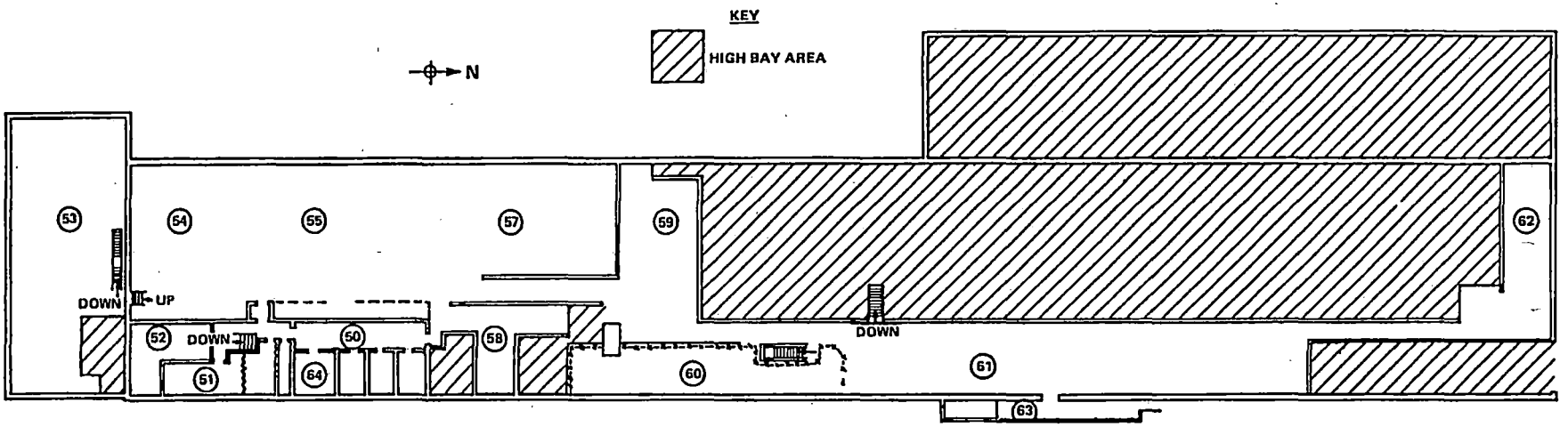
NUCLEAR MATERIALS AND EQUIPMENT CORPORATION
APOLLO, PENNSYLVANIA
FIRST FLOOR



1 RECEPTION
2 SECURITY & TIME CLOCK STATION
3 METALLOGRAPHY LABS (ML)
4 MAINTENANCE & WELDING SHOP (GPM)
5 MACHINE SHOP (MS)
6 INSTRUMENTAL CHEMICAL ANALYSIS LAB. (CH-1)
7 ANALYTICAL CHEMISTRY LAB. (CH-2)
8 INORGANIC CHEMISTRY R & D LAB (CH-30)
9 PROCESS DEVELOPMENT LAB (PC-1)
10 CERAMICS LAB (CF-2)
11 CORROSION TESTING LAB (CH-23)
12 PLANT WASTE TREATMENT AREA
13 HEALTH PHYSICS LAB (GPH-2)
14 INORGANIC CHEMISTRY LAB. (CH-32)
15 DISPENSARY (GPH-1)
16 REST ROOMS
17 CHANGE ROOMS
18 PROCESS COATING OXIDES (PC-2)
19 PROCESS COATING CARBIDES (PC-3)
20 CERAMICS FABRICATION (CF-1)
21 ARC MELTING AREA
22 TRANSFORMER STATION
23 LOW ENRICHMENT UF_6 CONVERSION PLANT (CP-1)
24 LOW ENRICHMENT SCRAP RECOVERY PLANT (CRP-1)
25 STORES
26 SHIPPING & RECEIVING
27 LOW ENRICHMENT RECEIVING STORAGE (M-VAULT)
28 LOW ENRICHMENT PRODUCT STORAGE (H-VAULT)
29 SAMPLE STORAGE
30 LOW ASSAY LIQUID STORAGE (G-VAULT)
31 QUALITY CONTROL & PHYSICAL TESTING LAB (QC)
32 HIGH ENRICHMENT ACCOUNTIBILITY CONT. STA. (P.S.)
33 HIGH ASSAY LIQUID STORAGE (E-VAULT)
34 HIGH ENRICHMENT PRODUCT STORAGE (F-VAULT)
35 HIGH ENRICHMENT IN-PROCESS STORAGE (A-VAULT)
36 NORMAL & DEPLETED STORAGE (L-VAULT)
37 PRODUCT SHIPPING AREA LOAD & HOLD (N-VAULT)
38 HEX STORAGE (J-VAULT)
39 EMPTY BIRD GAGE HOLD & CLEAN AREA (P-VAULT)
40 COMPRESSOR HOUSING & PAD
41 SCREENED OPEN AREA TO APOLLO MILL
42 VENTILATION OPENING IN F VAULT WALL
43 MAIN (VISITOR'S) ENTRANCE
44 EMPLOYEE ENTRANCE
45 SLIDING WOOD & METAL LOADING DOOR
46 SHIPPING & RECEIVING DOOR (EMERGENCY EXIT)
47 CORRUGATED STEEL VEHICLE DOORS
48 SCREENED PEDESTRIAN DOOR TO APOLLO MILL
49 DETEX WATCHCLOCK STATIONS

FIGURE A-2 (Cont'd)

NUCLEAR MATERIALS AND EQUIPMENT CORPORATION
APOLLO, PENNSYLVANIA
SECOND FLOOR



50 PRODUCTION CONTROL OFFICES
51 LUNCH ROOM
52 INORGANIC CHEMISTRY (GH-31)
53 GENERAL FABRICATION AREA (GF-1)
54 HIGH ENRICHMENT SCRAP RECOVERY (CRP-2)
55 HIGH ENRICHMENT UF_6 CONVERSION (CP-2)
56 PRODUCTION SERVICES (PS)
57 HIGH ENRICHMENT SCRAP RECOVERY (CRP-3)
58 IN-PROCESS STORAGE
59 SCRAP HEAD ENDING AREA
60 HIGH ENRICHMENT RECEIVING STORAGE (I-VAULT)
61 LOW ENRICHMENT PRODUCT BLENDING (CP-1)
62 RECONDITIONING AREA
63 OUTSIDE LOADING DOCK
64 PETEX WATCHCLOCK STATION

FIGURE A-2 (Cont'd)

(1977)

(1964)

2.2.1 Physical Barriers (U)

2.2.1.1 Fences (U)

(U) The fenced area outside of the north end of the building is enclosed by an 8 foot chain link fence (Ref. 7). The nuts, bolts, gate hinge pins and wire used to fasten the fence mesh to the fenceposts were not secured by welding or peening (Ref. 46). The documentation reviewed does not further describe the fence.

2.2.1.2 Walls (U)

(U) There were no walls, except some of those on the Uranium Plant itself, that served as PA physical barriers (Ref. 8).

(1977)

(1964)

2.2.1.3 Uranium Plant (U)

(U) As can be seen in Figure A-2, portions of the exterior wall of the Uranium Plant serve as PA physical barriers.

(U) The east perimeter wall of the building was made of brick. The north perimeter wall of the building was brick. The south and west walls of the facility were brick and/or concrete block. The roof of the facility was corrugated steel (Ref. 7).

(1977)

(1964)

2.2.1.4 Other Barriers (U)

(U) The documentation reviewed does not describe any other barriers.

2.2.1.5 Points of Ingress and Egress (U)

(U) (a) The chain link fence outside of the north end of the building has truck and personnel gates. The personnel gate was used as an emergency exit and was secured by a seal during the second and third shifts. This seal was checked during guard patrols (Ref. 7). The hinge pins in these gates were not secured by welding or peening (Ref. 46). A GAO audit discovered that the personnel gates could be opened without breaking the seal (Ref. 46).

(1977)

(1964)

2.2.1.5 Points of Ingress and Egress (U)
(Continued)

(U) (b) All other points of ingress and egress discussed in the documentation reviewed are also material access area points of ingress and egress and are discussed in Section 2.3.2.

SECURITY AREAS

(1977) (1964)

2.2.2 Isolation Zone (U)

2.2.2.1 General Description (U)

(U) The NUMEC Uranium Plant had no isolation zones.

SECURITY AREAS

(1977)

(1964)

2.2.2 Isolation Zone (U) (Continued)

2.2.2.2 Illumination (U)

(U) Exterior protective lighting was provided by flood lighting and street lighting (Ref. 7). Protective security lighting was controlled by photoelectric cells and electric timers with manual override switches (Ref. 9). This lighting did not meet all the standards of AEC Manual 2401 (Ref. 8).

2.2.3 Intervening Spaces (U)

2.2.3.1 General Description (U)

(U) Intervening spaces are shown on Figure A-2.

SECURITY AREAS

(1977)

(1964)

2.3 Vital Areas and Material Access Areas (U)

(U) The NUMEC Uranium Plant was licensed to contain up to 8,647 kilograms of Group I Uranium (as defined in Table A-1) such as oxide, carbide, nitrate, or fluoride forms (Ref. 5). The material was in many forms such as oxide, carbide, nitrite, or fluoride forms (Ref. 10).

This facility had no specific material access areas (MAA's); rather, special nuclear material was used throughout the interior of the Uranium Plant. SNM storage areas are indicated on Figure A-2 (Ref. 5).

2.3.1 Plant Construction (U)

2.3.1.1 MAA Physical Barriers (U)

(U) Since there were no interior MAA's, the MAA physical barriers are identical to the Uranium Plant portion of the protected area physical barriers.

2.3.1.2 VA Physical Barriers (U)

(U) There were no identified vital areas in the NUMEC Uranium Plant.

SECURITY AREAS

(1977)

(1964)

2.3.1.3 Openings (U)

(U) (a) There were industrial type windows along the east perimeter wall on the first floor (12 feet from ground level) and on the second floor (Ref. 7). Since the roof at the rear of the plant was about 3.5 feet away from the roof of the Raychord Building (access to which NUMEC did not control), openings were accessible from either the roof or the ground (Ref. 46).

(U) (b) An area on the northwest wall which separated the NUMEC Uranium Plant from the other occupant of the building (the Apollo Mill) was screened off with heavy gauge wire, ceiling-high. The documents indicate that this wire mesh screening could be opened to allow passage of heavy equipment between the NUMEC plant and the Apollo Mill (Ref. 10).

(1977)

(1964)

2.3.1.3 Openings (U) (Continued)

(U) (c) The west perimeter wall contained a plasterboard-covered, screened ventilation opening in the southwest part of the wall of the F vault SNM storage area. The opening measured approximately 16 inches wide by 30 inches high and was 80 inches above the inside floor of the F vault. The opening was covered with expanded metal screening, which was welded to an angle iron frame. The screen was secured with three toggle bolts to the inside wall, and during inclement weather the opening was covered with plasterboard. The opening lead to a space between the rear of the Uranium Plant and the adjacent Raychord Building, as illustrated in Figure A-3. During a GAO audit, one person was able to remove the bottom toggle and open the screen to about a 45^{0} angle within 15 seconds using no tools (Refs. 11 and 46).

SCHEMATIC OF SCREENED HOLE IN THE WALL OF F VAULT
AT NUMEC IN 1964

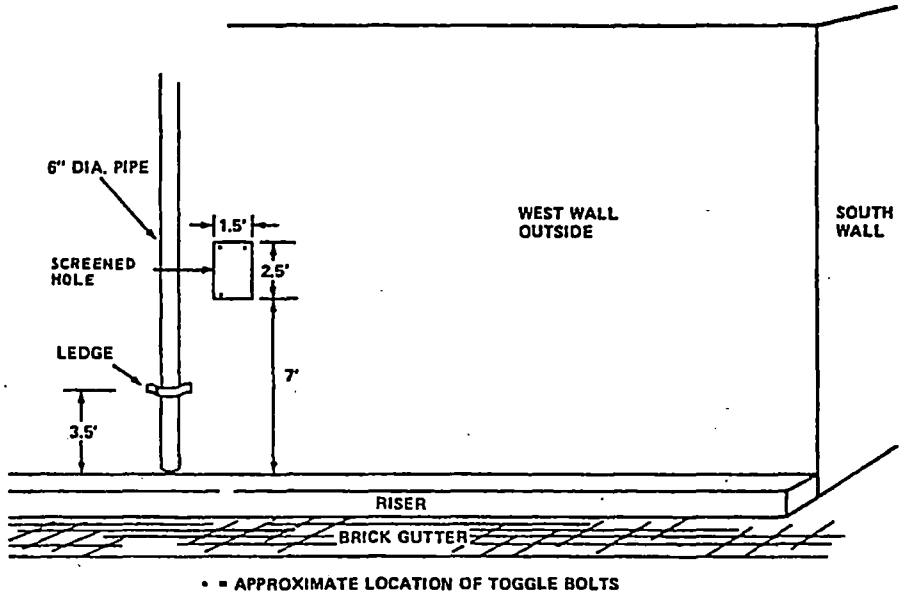


Figure A-3 (From Reference 46)

SECURITY AREAS

(1977)

(1964)

2.3.2 Points of Ingress and Egress (U)

(U) (a) The east perimeter wall of the NUMEC Uranium Plant contained two personnel doors which were the main entrance to the plant. These two solid-wood-frame glass-panel-inset doors were situated side by side, separated on the interior by a concrete block partition (Ref. 7).

(U) (b) The east perimeter wall also had a large sliding wood and metal loading door at the south end. (Ref 7).

(U) (c) At the north end of the building was a personnel door and two large adjoining corrugated steel vehicle doors, side-by-side. The personnel door was equipped with panic hardware on the inside, no hardware on the outside, and was required as an emergency exit (Ref. 7). These opened into the fenced area described in 2.2.1.

(U) (d) There were two solidly constructed wood and metal doors leading into open fenced storage areas on the outside of the west perimeter wall (Ref. 7). These doors were not used as emergency exits (Ref. 5).

(1977)

(1964)

2.3.2 Points of Ingress and Egress (U) (Continued)

(U) (e) There was also a pedestrian door in the northern perimeter wall. This door was constructed of sheet metal and could be opened or closed on the Apollo Mill side of the wall. By arrangement with Apollo Mill, this door was kept open during warm weather to provide ventilation in the facility's empty bird cage hold and clean area. A heavy gauge wire mesh screen was mounted on a steel frame which was spot welded to the metal door frame to provide a physical barrier (Ref. 2).

(U) These doors were not equipped with intrusion detection devices (Ref. 8). However one of the two personnel doors described in 2.3.2(a) and the personnel door described in 2.3.2(c) were sealed with wire security seals during the off shift periods. These seals were checked by the guard during his patrol (Ref. 7).

SECTION 3 - SECURITY ORGANIZATION

SECURITY ORGANIZATION

(1977)[1]

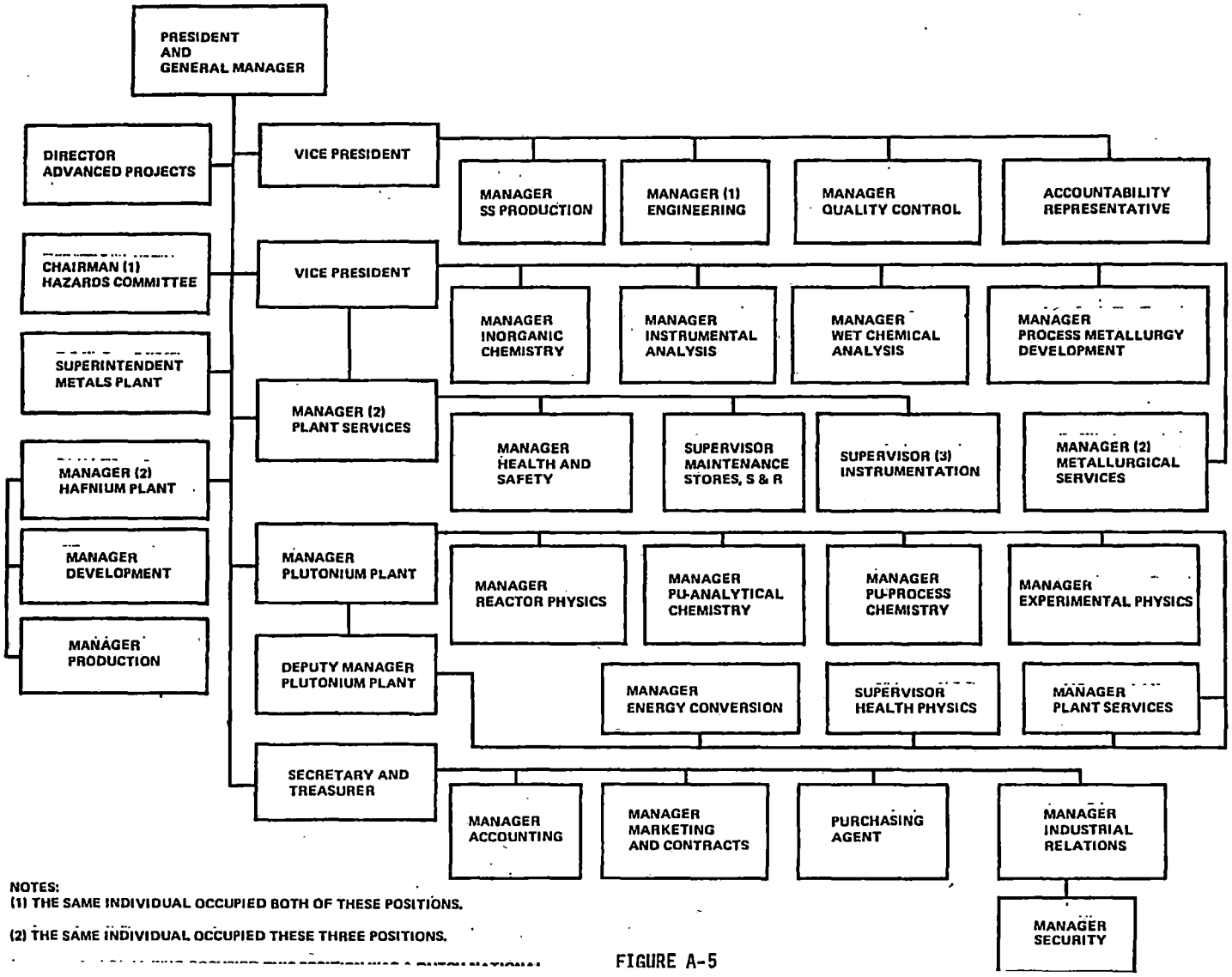
(1964)

(1) Note: All discussion of 1977 physical protection measures in sections 2 through 10 is from Reference 1.

3.1 Management Organization (U)

(U) The President and General Manager of the Nuclear Materials and Equipment Corporation (NUMEC) was responsible for the Uranium Plant activities. The responsibility for Uranium Plant security was vested in the Security Manager, who reported to the Industrial Relations Manager, who reported to the Secretary and Treasurer, who reported to the President and General Manager. Figure A-5 illustrates this organization (Ref. 5). Members of the guard force reported to the guard lieutenant, who reported to the Security Manager. Figure A-6 illustrates this organization (Refs. 5 and 13).

NUMEC ORGANIZATION
MARCH 1964



NOTES:
(1) THE SAME INDIVIDUAL OCCUPIED BOTH OF THESE POSITIONS.

(2) THE SAME INDIVIDUAL OCCUPIED THESE THREE POSITIONS.

FIGURE A-5

NUMEC SECURITY ORGANIZATION
MARCH 1964

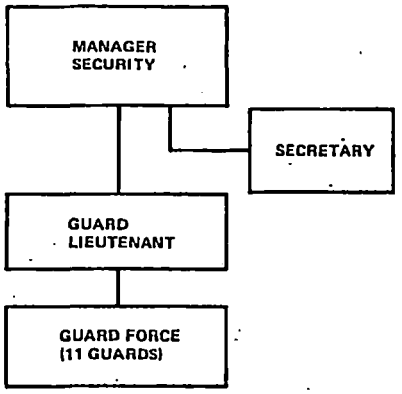


FIGURE A-6

SECURITY ORGANIZATION

(1977)

(1964)

3.2 Security Organization (U)

3.2.1 Security Manager Function (U)

(U) This function headed the Security Department and was charged with overall responsibility for the implementation of the security program (Ref. 5).

3.2.2 Security Officer Function (U)

(U) NUMEC had no security officer (Ref. 5).

3.2.3 Maintenance Foreman Function (U)

(U) The documentation reviewed does not indicate the organizational element responsible for the maintenance of security equipment.

SECURITY ORGANIZATION

(1977)

(1964)

3.2 Security Organization (U) (Continued)

3.2.4 Guard Foreman Function (U)

(U) NUMEC had no guard foreman (Ref. 5).

3.2.5 Guard Force (U)

(U) Guards were employed by the NUMEC Company and were part of the facility organization (Ref. 13). The guard force was organized on a full coverage shift basis with the guard lieutenant covering the Apollo and Parks Township Sites on the day shift and one guard on duty at the Apollo Site on the off shifts (Refs. 7, 8, 10, and 14). Security guards were uniformed and equipped with .38 caliber revolvers (Ref. 13). Their primary function was the protection of classified matter, equipment, and all plant property through police and patrol activities (Ref. 5). Paragraph 3.5 further describes guard force assignments.

3.2.5.1 Captain(s) (U)

(U) The NUMEC facility had no guard force captains. However, there was a guard lieutenant who provided such administrative assistance as destruction of classified documents and transmitting classified documents to the various locations in addition to supervising the guard force (Ref. 10).

SECURITY ORGANIZATION

(1977)

(1964)

3.2 Security Organization (U) (Continued)

3.2.5.2 Sergeants (U)

(U) The NUMEC facility had no guard force sergeants (Ref. 5).

3.2.5.3 Specialists (U)

(U) The NUMEC facility had no specialists. However, the guard force lieutenant did change the combinations on the locks on classified document repositories in the facility (Refs. 5 and 13).

3.3 Security Personnel (U)

3.3.1 Qualification (U)

(U) Security guards ranged in age from 26 to 40 years (Ref. 7) with an average age of about 30 years (Ref. 13). They were subject to a semi-annual physical examination and were to be of average intelligence and capable of performing their official duties (Ref. 13). All members of the guard force had previous military or police experience (Ref. 13).

(1977) (1964)

3.3 Security Personnel (U) (Continued)

3.3.1 Qualification (U) (Continued)

The Lethal Weapons Training Act of the Commonwealth of Pennsylvania was not in effect at this time.

(1977)

(1964)

3.3 Security Personnel (U) (Continued)

3.3.2 Screening (U)

(U) All guards had an AEC "Q" clearance (except one, who in 1964 had an interim "L" clearance with a "Q" clearance pending) (Ref. 13). Prior police or military experience was a prerequisite for employment as a guard (Ref. 7). Pre-employment practices for local applicants included a check with police departments within a 50-mile radius at Apollo; a check of references with previous employers, other than relatives; and a check with each of the three references listed on the employment application (Ref. 8).

3.3.3 Training Program (U)

(U) Guards were trained in the following areas:

(a) Firearms and firearm safety (Refs. 10 and 13)

(b) Emergency evacuation plans (Ref. 10)

(c) Communication (Ref. 10)

(d) First Aid (Ref. 10)

(1977) (1964)

3.3 Security Personnel (U) (Continued)

3.3.3 Training Program (U) (Continued)

(e) Fire fighting (Ref. 10)

(f) Operation and use of special equipment (Ref. 10)

The firearms training in 3.3.3(a) was conducted at a firing range maintained by NUMEC at the Parks Township location (Ref. 13). Guards were required to qualify (to police standards) firing at silhouette and NRA "B" type targets during March and April of each year (Refs. 10 and 13).

SECURITY ORGANIZATION

(1977)

(1964)

3.3 Security Personnel (U) (Continued)

3.3.3 Training Program (U) (Continued)

3.4 Security Equipment (U)

3.4.1 Weapons (CNSI)

(U) Each guard was equipped with a 0.38 caliber revolver and five (5) rounds of ammunition, all of which were in the revolver (Refs. 10 and 13). Guards were not equipped with shotguns or rifles (Ref. 15).

SECURITY ORGANIZATION

(1977)

(1964)

3.4 Security Equipment (U)

3.4.2 Radios (U)

(U) Guards were not equipped with walkie-talkie radios or portable communication devices (Ref. 5).

3.4.3 Uniforms (U)

(U) Guards were uniformed (Ref. 13) but the documents reviewed did not describe guard uniforms.

3.5 Posts and Patrols (U)

(U) During the day shift there was one guard, the guard lieutenant, who divided his time between the Apollo and Parks Township sites (Refs. 7, 10, and 14). During both the 4:00 p.m. to Midnight, and the Midnight to 8:00 a.m. shifts, one guard was on duty at the Apollo facility and he divided his time between the Uranium Plant and patrols of the Office Building (Refs. 7, 8, 10, and 16). Guard posts are described below:

SECURITY ORGANIZATION

(1977)

(1964)

3.5 Posts and Patrols (U) (Continued)

3.5.1 CAS Post (U)

(U) The nearest thing to a CAS post at NUMEC was the receptionist's desk in the plant entrance area. During regular business hours, this post was manned by a full time receptionist (Ref. 7). During the off-shifts and on weekends, the guard at the Apollo facility was stationed here when he was not conducting watchclock patrols (Ref. 7). Typical responsibilities of this post included control of access to the Uranium Plant and visitor control (Ref. 6). At this time a central alarm station did not exist and personnel searches were not performed on individuals entering or exiting the plant (Refs. 17, 18, and 19). Incoming packages were not searched. During shift change, employee access to the plant was controlled by a guard at the adjacent employees' entrance (Ref. 6. Personnel searches were not performed on employees entering or exiting the plant (Refs. 17, 18, and 19). However, from time to time on a non-scheduled basis, the guard did make lunch bucket checks looking for theft of government property, including special nuclear material. These checks were made at shift change, no less frequently than once per month and consisted of a visual inspection of the lunch bucket (Refs. 10, 17, and 19.

SECURITY ORGANIZATION

(1977)

(1964)

3.5 Posts and Patrols (U) (Continued)

3.5.2 MAA Post (U)

(U) This was not a separate post in 1964.

3.5.3 Site Patrol Post (U)

This was not a separate post in 1964. However, during the off-shifts and on weekends the guard on duty at the Apollo site patrolled 11 Detex key stations in the Uranium Plant and the Office Building (Ref. 8). Two of these Detex key stations were in the Office Building and the remaining nine were in the Uranium Plant (Ref. 18). Detex key stations within the uranium plant were located in the following areas: (1) at the large sliding wood and metal leading door at the south end of the east perimeter wall (Refs. 5 and 7); (2) immediately outside the east door at the E&F vault storage area (Ref. 20); (3) within the E&F vault storage area (Ref. 20); and (4) in the office of the Material Accountability Office

(1977) (1964)

3.5 Posts and Patrols (U) (Continued)

3.5.3 Site Patrol Post (U) (Continued)

on the second floor (Ref. 21). (Location of the other 5 Detex key stations was not described in the documents reviewed.) In addition to the key stations, during these patrols, the guard checked all exterior doors, which were to be secured during the off-shifts and on weekends (Ref. 7). Although patrols were conducted hourly, they were not made in a fixed pattern, nor were the key stations recorded at the same time each hour (Ref. 13).

3.5.4 Response Post (U)

(U) This post did not exist in 1964.

3.5.5 MPA Post and Guard Station Post ((U)

(U) These posts did not exist in 1964.

(1977) (1964)

3.5 Posts and Patrols (U) (Continued)

3.5.6 Other Positions (U)

(U) Although the security manager function existed in 1964, the documents give no indication that he would be called to handle unusual occurrences or emergencies. In fact, responsibility for handling security during a criticality emergency was delegated to the guard force lieutenant (Ref. 5).

SECURITY ORGANIZATION

(1977)

(1964)

3.6 Drills (U)

(U) The documents reviewed do not indicate that any security drills were performed.

SECTION 4 -ACCESS CONTROL

SECTION 4.0

ACCESS CONTROL

(1977)[1]

[1] Note: All discussion of 1977 physical protection measures in Sections 2 through 10 is from Reference 1.

(1964)

4.1 Badge System (U)

(U) Color-coded picture badges were issued to all NUMEC employees who were authorized unescorted access to any areas in the Uranium Plant beyond the reception area (Ref. 5). These permanent badges contained identifying information (personal data of a type not documented but approved by the AEC New York Operations Office (Ref. 16)) and were countersigned by the Security Manager (Ref. 8). NUMEC employees wearing permanent badges retained possession of them upon exit from the Uranium Plant (Ref. 5). In the event that a permanent employee reported to work without his badge, he was to be issued a color-coded temporary badge after proof of employment and clearance level had been established by the receptionist or guard on duty (Ref. 5). Temporary badges were returned upon exit from the Uranium Plant. (Ref. 8)

(U) Color-coded non-photograph, escort badges were issued to visitors, including NUMEC employees not normally assigned to the location being visited. Visitors (a) were escorted throughout the Uranium Plant, (b) registered upon entrance to the plant (Ref. 5),

(1977)

(1964)

and (c) returned their escort badges upon leaving the plant (Ref. 8). These requirements applied to all visitors including personnel with official status such as AEC, FBI, Civil Service, Police, or members of the NUMEC Board of Directors, and vending machine company employees who serviced the equipment in the employee's cafeteria in the Uranium Plant (Refs. 5 & 8).

4.1.1 Types of Badges (U)

(U) No general description of the badges was provided in the documentation reviewed.

4.1.1.1 Badges for Personnel Who Possess "Q" Clearances (U)

(U) (a) Yellow, Photograph - Permanent badges, these were issued to NUMEC employees assigned to the Uranium Plant (Ref. 5).

(U) (b) Yellow, Non-Photograph - These were issued to (1) individuals whose yellow, photograph badges had been lost or forgotten or (2) visitors (Ref. 5).

(1977)

(1964)

4.1.1.2 Badges for Personnel Who Possess "L" Clearances (U)

(U) (a) Grey, Photograph - These were issued to NUMEC employees assigned to the Uranium Plant (Ref. 5).

(U) (b) Grey, Non-Photograph - These were issued to (1) individuals whose grey, photograph badges had been lost or forgotten or (2) visitors (Ref. 5).

4.1.1.3 Badges for Personnel Who Possess "DOD" Clearances (U)

(U) A DOD secret clearance was indicated by a red stripe in the lower right hand corner of one of the types of badges described in 4.1.1.1, 4.1.1.2, or 4.1.1.4 (Ref. 5).

(1977)

(1964)

4.1.1.4 Badges for Uncleared Personnel (U)

(U) (a) Blue, Photograph - These were issued to NUMEC employees assigned to the Uranium Plant (Refs. 5 & 13).

(U) (b) Blue, Non-Photograph - These were issued to (1) individuals whose blue, photographic badges had been lost or forgotten or (2) visitors (Ref. 5).

4.1.1.5 Other Types of Badges (U)

(U) Everyone who went past the reception desk at the Uranium Plant was required to wear a NUMEC identification badge as described in 4.1.1.1 - 4.1.1.4 (Ref. 5).

4.1.2 Coding of Badges (U)

(U) The badge system was not used to distinguish areas within the Uranium Plant to which individuals were authorized access (Ref. 5). This was done through posted access lists in the areas (Ref. 5). The documentation reviewed does not describe any features incorporated into the badges to render counterfeiting difficult.

(1977)

(1964)

4.1.3 Control System for Badges (U)

(U) Badges were issued and controlled by the guard lieutenant (Ref. 13). Upon termination or layoff, Uranium Plant employees were required to surrender their permanent badges to the Security Department or, on holidays, weekends, or the off shifts to the foreman in charge (Ref. 5). If over 5 percent of the badges issued were lost, NUMEC's procedures called for a complete reissue of badges with a different color coding (Ref. 5). (This was done in 1962 and 1966 (Refs. 8 & 12).) Visitor and temporary badges were accounted for on a daily basis by the guards (Ref. 8). The documentation reviewed does not describe what records, if any, were kept for this purpose.

(1977)

(1964)

4.1.4 Utilization of Badges (U)

(U) In the Uranium Plant, badges were required to be worn above the waist with the photograph visible (Ref. 5).

4.2 Access Authorization (U)

(U) The Guard Lieutenant controlled access of employees to the Uranium Plant through issuance and control of employee badges (Refs. 5 & 13). The Security Manager was responsible for controlling the access of visitors to the Uranium Plant (Ref. 13).

(U) Authorization for access to SNM storage areas (vaults) was granted by the vault custodian (Ref. 5).

4.3 Access Registration (U)

(U) All visitors entering the Uranium Plant, including NUMEC employees not normally assigned to the Uranium Plant, were required to sign a company visitor log. In addition, all visitors, whose visits involved access to classified information, and aliens were required to sign a visitor control form (Refs. 5 & 6). Information on the visitor logs included citizenship, name of employer, and purpose of visit (Ref. 8).

(1977)

(1964)

(U) All incoming truck deliveries, including the names of the drivers were recorded by the Chief Shipping Clerk (Ref. 6). These daily register sheets were picked up and reviewed at the end of each working day by the Guard Lieutenant and maintained in a permanent record (Ref. 7). These are the only access registration procedures described in the documents reviewed.

4.4 Personnel Escort (U)

(U) Non-employee visitors were required to be escorted by an authorized, responsible employee at all times while within the plant (Ref. 5).

4.5 Personnel Access (U)

(U) Access to the NUMEC Uranium Plant was required to be limited to authorized individuals who were positively identified (Ref. 5).

(1977) (1964)

4.5.1 Protected Area (U)

4.5.1.1 Access Points (U)

(U) (a) Access to the fenced area outside of the north end of the building is administratively controlled by the Chief Shipping Clerk during regular working hours. The personnel gate in this fence was required as an emergency exit and therefore was not locked (Ref. 7).

(U) (b) All other access points to the protected area are also access points to the Uranium Plant itself and are described in Section 4.5.2.

4.5.1.2 Personnel Searches (U)

(U) NUMEC performed no personnel searches at protected area access points (Refs. 17, 18, 19, & 22).

(1977)

(1964)

4.5.1.3 Indirect Control of Access Points (U)

(U) When controlled indirectly (i.e., during the off shifts) the access point in 4.5.1.1.a was subject to the following restrictions:

(U) (a) The gate was sealed on the outside with a wire security seal.

(U) (b) The security seal was checked during the guard patrol (Ref. 7).

4.5.1.4 Off-Shifts (U)

(U) During the off-shifts, the access point in 4.5.1.1.(a) was controlled indirectly as specified in 4.5.1.3 (Ref. 7).

(1977)

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4.5.2 Vital Areas and Material Access Areas (U)

(U) As noted in Section 2.3, the NUMEC Uranium Plant had no specific material access areas (MAA's); rather special nuclear material was used throughout the interior of the plant.

4.5.2.1 Access Point(s) (U)

(U) (a) The main (visitor's) entrance to the Uranium Plant was controlled by a receptionist during the day shift (7:45 am to 4:20 pm) (Ref. 16). On the off shifts this door was locked from the inside and controlled by a guard who maintained his duty station at the receptionist's desk except when he was conducting patrols and perimeter checks. Use of this door for ingress or egress between shift changes on the off shifts was limited to when the guard was present (Ref. 7).

(U) (b) The employee's entrance, adjacent to the main entrance, was opened only during the day shift change (7:00 am to 7:45 am and 4:20 pm to 4:45 pm (Ref. 16)) at which time access was controlled by a

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guard (Ref. 6). At all other times this door was locked and sealed with a wire security seal (Ref. 6).

(U) (c) The large sliding wood and metal loading door at the south end of the east perimeter wall was locked from the inside unless attended (Ref. 7).

(U) (d) The side-by-side corrugated steel vehicle doors at the north end of the building were secured at all times except when shipments or deliveries were being made. When shipments or deliveries were being made, this access point was controlled by the shipping clerk (Ref. 7). Despite the procedural requirement that these doors be closed except when shipments or deliveries were being made, they were frequently left open during the day shift (Ref. 45).

(U) (e) The personnel door at the north end of the building was required as an emergency exit. It was equipped with panic hardware on

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the inside and no hardware on the outside. During the day shift, this access point was controlled by the shipping clerk. During the off shifts a wire security seal was affixed to the outside of this door which was checked during guard patrols (Ref. 7).

(U) (f) The wood and metal loading doors leading into the open fenced storage areas on the exterior side of the west perimeter wall were maintained in a secured position at all times unless attended (Ref. 7).

(U) (g) The wire mesh screened pedestrian door in the northern perimeter wall was administratively controlled by shipping personnel during normal plant hours and subject to guard inspection during the off shifts (Ref. 12).

4.5.2.2. Access Controls (U)

(U) Entry into a vault (SNM storage area) was controlled by the vault custodians. Normally transactions involving special nuclear material were made at the door

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of the vault with the vault custodian accepting or delivering material upon the request of an authorized individual. (Individuals were authorized to conduct material transactions by their supervisors. A list of individuals so authorized was posted in the vault office (Ref. 5).) Although procedures required that SNM storage vault doors be locked when the vaults were unattended, security guards discovered SNM storage vaults unlocked and unattended on three separate occasions between April 1963 and June 1964 (Ref. 13).

4.5.2.3 Authorized Individuals (U)

(U) The Guard Lieutenant controlled access of employees to the Uranium Plant through issuance and control of employee badges (Refs. 5 & 13). The Security Manager was responsible for controlling the access of visitors

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4.5.2.3 Authorized Individuals (U) (Continued)

to the Uranium Plant (Ref. 13). Combinations or keys to the vaults (SNM storage areas) are controlled by Nuclear Material Accountability personnel (Refs. 14 & 17).

4.5.2.4 Exit Search (U)

(U) (a) There was no search of individuals leaving the Uranium Plant (Refs. 17, 18, 19, & 22).

(U) (b) From time to time on a non-scheduled basis, the security guard made lunch bucket checks looking for theft of government property, including special nuclear material. These checks were made at shift change no less frequently than once per month. Employees exiting the facility at times other than shift change were not subject to lunch bucket or package checks. The lunch bucket check only consisted of a visual examination (Refs. 10 & 17).

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4.5.3 Two-Man Rule (U)

(U) NUMEC did not employ methods to observe (authorized) individuals within MAA's to assure that SNM was not being diverted (Refs. 5, 17, & 20).

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4.6 Package and Container Controls (U)

4.6.1 Protected Areas (U)

(U) Packages entering the protected area or the Uranium Plant were not searched (Ref. 17).

4.6.2 Vital Areas and Material Access Areas (U)

4.6.2.1 Containers of SNM Not in Process (U)

(U) Special nuclear material not in process was stored in a "vault" area. Ten "vault" areas were established for storage of materials. One was an actual vault of concrete block construction [meeting the requirements specified in Section 1.2.7.2(c) of this appendix rather than 10 CFR 73.2 (n)] while the others were chain link fenched areas in the interior of the plant (Refs. 14, 23, 24, & 43).

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4.6.2.2 Containers of In-Process SNM (U)

(U) Material in process was attended by NUMEC employees and protected by the equipment used (Ref. 14).

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4.6.2.3 Tamper-Safing Requirements (U)

(U) NUMEC did not use tamper-indicating devices on any of their special nuclear material containers (Refs. 25, 26, 27, 28, 29, & 35).

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4.6.2.4 Miscellaneous Packages (U)

(U) (a) NUMEC did not search items entering the Uranium Plant (Ref. 17).

(U) (b) Lunch buckets and similar personal items were permitted entry into the Uranium Plant (Refs. 10 & 17).

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4.6.3 Containers of SNM for Shipment (Excluding Wastes for Burial (U)

4.6.3.1 Domestic Shipments (U)

(U) (a) Upon completion of the preparation of the material, the Production Department Project Engineer or his designee initiates a basic internal control document. "Shipper's Check List which serves to ensure that that the material quantity, quality, packaging and shipping requirements are satisfied. All necessary information pertaining to the material shipped is entered by Production, e.g., material description; uranium and U-235 analysis method used for each tare, gross and net weight and type of scale used. The document is signed by the Project Engineer and approved for shipment.

(U) (b) The material and the "Shipper's Check List" are issued to the vault where the vault custodian, as the representative of Nuclear Materials Management Department, adds additional shipping information, checkweights the material and checks the Production Department's data, retains

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4.6.3 Containers of SNM for Shipment (Excluding Wastes for Burial (U) (Continued)

(U) (b) (Continued)

a copy of the detailed back-up list attached to the "Shipper's Check List" and issues the material to the quality Control Department.

(U) (c) The Quality Control Department, after having found the product acceptable, certifies the shipment and signs the "Shipper's Check List" and approves the material for shipment.

(U) (d) The material flows back to the vault custodian where the material is rechecked against the retained back-up list and the "Shipper's Check List" is signed by the Nuclear Materials Management Manager and approved for shipment.

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(U) (e) The Receiving and Shipping Department upon receipt of the material counts containers, checks net weights on the containers to the back-up list and the "Shipper's Check List" and packages material for shipment. The Shipping Supervisor approves the shipment by signing the "Shipper's Check List."

(U) (f) The Nuclear Safety Engineer examines shipment and confirms proper packaging with his signature and date to the "Shipper's Check List."

(U) (g) Health and Safety Engineer monitors the outer container for radioactive contamination and indicates approval with his signature and date (Ref. 42).

(U) (h) The Nuclear Material Manager issues a Form AEC-388 (Section 53 material) or a Form AEC-101 (non-Section 53) material Ref. 45).

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(1964)

4.6.3.2 International Shipments (U)

(U) (a) Upon receipt of a purchase order, NUMEC determines through the AEC Division of International Affairs (DIA) that an agreement exists between the United States and the foreign entity and DIA issues NUMEC a contract number.

(U) (b) When material is ready for shipment, NUMEC's Shipping and Receiving Department will prepare the Shipper's Export Declaration and issue to DIA.

(Shipper's Export Declaration is a Department of Commerce form presented to the Collector of Customs or Postmaster which declares that all conditions of export control regulations have been met.)

(U) (c) NUMEC notifies the customer by letter or phone that material is ready for shipment and requests:

(U) (1) shipping instructions if they were not included in the purchase order;

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(U) (2) a letter of acceptance be issued to DIA, which letter includes material description, form, quantity and enrichment as supplied by NUMEC and is the same information that will appear on the transfer form; and

(U) (3) that notification of date and place of receipt of material be issued DIA when material is received, contractually through a lease or a sale agreement that is in the port of export.

(U) (d) DIA, based on the letter of acceptance (c.(3) above), completes the Shipper's Export Declaration and issues same to NUMEC. The completed Shipper's Export Declaration constitutes NUMEC's authority from the AEC to ship material.

(U) (e) NUMEC Shipping and Receiving Department issues material and includes Quality Control Certification, Monitoring Results and Packing List.

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(U) (f) Upon notification from the Shipping and Receiving Department, the Manager, Nuclear Materials Management, NUMEC, issues a Form AEC-101 to DIA. (Form AEC-388 is used when shipping domestic leased Section 53 material.)

(U) (g) Upon notification from the requester government that material has been received (notification of place of receipt is the port of export) DIA signs the Form-388 or Form-101 indicating receipt of material (Ref. 42).

4.6.4 Waste for Burial (U)

(U) The documents reviewed indicate that NUMEC had no controls on waste for burial beyond those required for health safety (Refs. 31, 32, 33 & 34).

(1977)

(1964)

4.6.5 Operations Outside An MAA (U)

4.6.5.1 Manufacturing Operations (U)

(U) The documents reviewed do not identify any manufacturing operations performed outside the Uranium Plant.

4.6.5.2 Storage of Containers (U)

(U) Uranium bearing air filters and combustible waste were stored outside of the Uranium Plant in a shed referred to as the "blue room" (Refs. 36 & 37).

(1977)

(1964)

4.6.5.3 Laboratories (U)

(U) NUMEC had a laboratory (the gas lab) in the basement of the Office Building. This laboratory was used to determine the concentration of certain impurities in special nuclear material as a part of the quality control program (Ref. 44). All other laboratories at NUMEC's Apollo site were within the Uranium Plant (Ref. 5).

4.6.5.4 Room CH-32 (U)

(U) Room CH-32 was within the Uranium Plant (Ref. 5).

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4.7 Vehicle Access (U)

4.7.1 Vehicle Access Points (U)

(U) A vehicle access point (a truck gate) existed in the 8 foot chain link fence at the north end of the building (Protected Area). Inside the fence on the north end of the building were two large side-by-side corrugated steel vehicle doors. The gates were kept locked with a padlock at all times except when shipments or deliveries were being made (Ref. 7). The gates were equipped with a locally annunciating alarm as described in Section 5 (Ref. 8). The vehicle doors were secured by a large steel bolt arrangement on the inside which could not be opened from the outside (Ref. 7).

4.7.2 Protected Area (U)

(U) The Chief Shipping Clerk who maintained his station adjacent to the vehicle doors during regular working hours (all shipments were dispatched or received during the day shift) was responsible for controlling the vehicle access gates (Refs. 6 & 7). The documents reviewed do not indicate that there were any admission procedures for vehicles.

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4.7.3 Vital Areas and Material Access Areas (U)

(U) Trucks and non-company drivers were not permitted access to the Uranium Plant beyond the shipping and receiving point (Ref. 6). The screened open area in the northern perimeter wall of the plant may have been used for passage of equipment such as fork lifts (Ref. 10 cites heavy equipment). The documents reviewed do not indicate that there were any required procedures for escorting, observing, searching, or releasing vehicles.

4.8 Locks, Keys, and Combinations (U)

(U) The following doors and gates were equipped with key locks: Northeast vehicle gate (Ref. 7), overhead door in northern perimeter wall (Ref. 10), Main (visitors) entrance (Ref. 7), and the Employees entrance (Ref. 7). The following doors were equipped with combination locks: Wood and metal loading door (Ref. 7), vault door (Ref. 5), E & F vault (Ref. 15), and the I vault (Ref. 5).

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4.8.1 Locks (U)

4.8.1.1 Combination Locks and Padlocks (U)

(U) Combination locks and combination padlocks are three-position changeable combination locks or AEC approved locks (Refs. 5, 7, & 15). (AEC Manual Chapter 2401 specified three-position combination locks (Ref. 4).)

4.8.1.2 Key Locks and Padlocks (U)

(U) The documentation reviewed does not provide a description of the key locks that were used at the Uranium Plant.

4.8.1.3 Electric Locks (U)

(U) The documentation reviewed does not indicate that electric locks were used at the Uranium Plant.

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4.8.1.4 Mechanical Locks (U)

(U) Mechanical locks were used as panic hardware on the personnel door in the northern perimeter wall and as a locking bolt arrangement on the vehicle doors on the northern perimeter wall (Ref. 7). These locks could only be opened from the inside of the Uranium Plant (Ref. 7).

4.8.1.5 Break-Away Key Padlocks (U)

(U) The documentation reviewed does not indicate that break-away key padlocks were used at the Uranium Plant.

4.8.2 Keys and Combinations (U)

(U) The guard force controlled all keys to all doors except the key padlock on the vehicle gate (the Chief Shipping Clerk had a key) and the main entrance (a number of cleared management personnel had keys) (Refs. 7 & 10). There was only one set of guard force keys and they were passed from shift to shift (Ref. 14). The documents reviewed do not describe procedures for issuance of keys, procedures for maintaining and securing lock and key records, or procedures for changing locks and dealing with lost keys.

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(U) Combinations to the locks on the vaults were controlled by the Material Accountability personnel (Ref. 14). (The Foreman, SS Material Accountability and four vault custodians (Ref. 17).) However, the combination to the E & F vault was known to some members of the guard force because there was a Detex clock key station inside of the vault (Ref. 20). All vault door combination locks were changed whenever a custodian terminated his employment (Ref. 17). The documentation reviewed does not indicate the procedures followed in maintaining and securing records related to lock combinations.

(U) Room CH-32 was controlled as an exclusion area and kept locked when unoccupied. Individuals were admitted to the room on the basis of an access list posted in the room (Refs. 5 & 6).

SECTION 5 INTRUSION AND DETECTION DEVICES

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)(1)

(1964)

(1) Note: All discussion of 1977 physical protection measures in sections 2 through 10 is from Reference 1.

5.1 Design and Performance Characteristics: Sensors (U)

5.1.1 General (U)

(U) The sensor (intrusion detection device) at the NUMEC Uranium Plant was not connected to an alarm system which annunicated anywhere except at the location of the sensor. There were no intrusion detection sensors within the Uranium Plant or on MAA moveable barriers (Ref. 8).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977) (1964)

5.1.2 PA Emergency Exits (U)

(U) The uranium Plant had no sensors on the protected area emergency exits (Refs. 8, 38).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)

(1964)

5.1.3 VA and MAA Emergency Exits (U)

(U) The Uranium Plant had no sensors on the material access area (plant) emergency exits (Refs. 8, 38).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)

(1964)

5.1.4 PA Intrusion Devices (CNSI)

(U) The only intrusion detection device for the protected area was a local alarm which is discussed in Section 5.3 (Refs. 8, 39).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)

(1964)

5.1.5 VA and MAA Intrusion Devices (U)

(U) The Uranium Plant had no intrusion detection sensors in the material access area (Refs. 8, 38, 39).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)

(1964)

5.2. Design and Performance Characteristics: Detectors (U)

5.2.1 General (U)

(U) The NUMEC Uranium plant personnel did not use explosive, metal, or special nuclear material detectors (Refs. 17, 18, 22).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)

(1964)

5.2.2 PA Metal Detectors (U)

(U) A metal search of individuals entering the protected area was not conducted at the NUMEC Uranium Plant (Refs. 7, 17, 19, 22).

5.2.3 PA Explosives Detectors (U)

(U) An explosives search of individuals entering the protected area was not conducted at the NUMEC Uranium Plant. (Refs. 7, 17, 19, & 22)

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977) (1964)

5.2.4 MAA Metal Detectors (U)

(U) Metal detectors were not employed in the search described in Section 4.5.2.4(b) (Ref. 17).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977)

(1964)

5.2.5 MAA SNM Detectors (U)

(U) Special Nuclear Material detectors were not employed in the search described in Section 4.5.2.4(b) (Ref. 17).

5.3 Local Alarms (U)

(U) The NUMEC Uranium plant used a local alarm on the shipping gate (Ref. 8). It was comprised of the following:

Sensor: Minneapolis-Honeywell Microswitch (Serial 1 catalog #OPD-Q-Microswitch Division) (Ref. 16).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977) (1964)

5.3 Local Alarms (U) (continued)

Annunciator:	3-inch gong (Bell-Edwards 156-3 rated 8/12 volts) with Transformer (Wesco #890) and Light Bulb (Ref. 16).
Source of Emergency Power:	Yes
Connected to CAS:	No

The NUMEC Uranium Plant did not use local alarms on the material access area exit doors (Ref. 8).

5.4. Isolation Zone Monitoring (CNSI)

(U) The only alarm with which the Uranium Plant protected area physical barriers were equipped was the local alarm described in section 5.3 (Ref. 8).

SECTION 5.0

INTRUSION AND DETECTION DEVICES

(1977) (1964)

5.5 Emergency Power (U)

(U) The existance of emergency power provisions for the NUMEC Uranium Plant is indicated in the documentation (Ref. 16). However, no description is given in the documentation reviewed.

SECTION 6 CENTRAL ALARM AND COMMUNICATION SYSTEMS

SECTION 6.0

CENTRAL ALARM AND COMMUNICATION SYSTEMS

(1977)[1]

[1]Note: All discussion of 1977 physical protection measures in Sections 2 through 10 is from Reference 1.

(1964)

6.1 Facilities (U)

(U) The nearest thing to a CAS post at NUMEC was the receptionist's desk in the plant entrance area. NUMEC had no post comparable to a Secondary Alarm Station. No special bullet resistant or penetration resistant construction was provided for this area (Ref. 7).

6.2 Staffing (U)

(U) During regular business hours this post was manned by a full time receptionist. During the off-shifts and on weekends, the guard at the Apollo facility was stationed here when he was not conducting watchclock patrols (Ref. 7).

6.3 Alarm Equipment (U)

6.3.1 Remote Annunciator Panel (U)

(U) The NUMEC Uranium Plant did not use any type of remote annunciator panel for security detection devices (Ref. 8).

(1977)

(1964)

6.3.2 Alarm Zone Reset (U)

(U) This consideration is not applicable since the Uranium Plant had no remote alarm annunciator panel for security detection devices (Ref. 8).

6.3.3 Maintenance (U)

(U) The documentation reviewed does not provide any details of the maintenance procedures for the alarm on the truck gate at the north end of the Uranium Plant.

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6.4 Communication Systems (U)

6.4.1 Telephones (U)

(U) Normal telephone communication is provided between the receptionist's desk in the Uranium Plant and the Plutonium Plant and the LLEA (local Apollo Police and/or local State Police) (Refs. 7, 10).

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(1964)

6.4.2 Local Communication (U)

(U) Telephone service and a plant-wide paging service were provided (Refs. 7, 10, 44). The guard force was not equipped with two-way walkie-talkie radios (Ref. 15). The documents reviewed do not discuss a security vehicle.

6.4.3 Radio Communication (U)

(U) A radio communication network with local police had not been established (Ref. 39).

6.4.4 Silent Alarm (U)

(U) The documents reviewed do not mention a silent alarm. Since the documents indicate that the NUMEC Uranium Plant did not have a local radio communication network (Ref. 15), it is unlikely that a silent alarm system existed.

SECTION 7 RESPONSE TO SECURITY CONTINGENCIES

SECTION 7.0

RESPONSE TO SECURITY CONTINGENCIES

(1977)[1]

[1] Note: All discussion of 1977 physical protection measures in Sections 2 through 10 is from Reference 1.

(1964)

7.1 Organization and Procedures (U)

(U) Since there was usually only one guard (sometimes no guards) on duty at the NUMEC Uranium Plant, a detailed delineation of the responsibilities of individual guards in the event of a suspected security threat was probably not considered necessary (Refs. 7, 8, 10, 14). However, AEC security inspectors reported that guard duties were well defined in post and patrol orders (Ref. 13).

7.2 Alarm Response (U)

7.2.1 Suspected Intrusion into a Security Area (U)

(U) The guard was instructed to intercept person(s) gaining or attempting to gain unauthorized access to security areas (Ref. 9).

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7.2.2 Apparent Attempted Theft of SNM (U)

(U) The guard was instructed to act as necessary in the event of attempts to commit espionage, sabotage, or other criminal acts (Ref. 9). Beyond this, no pre-arranged response to attempts of unauthorized removal of SNM from the plant by one or more individuals had been documented (Ref. 39).

7.2.3 Apparent Attempted Smuggling of Contraband into the Protected Area (U)

(U) The guard was instructed to act as necessary in the event of attempts to commit espionage, sabotage, or other criminal acts (Ref. 9).

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7.2.4 Bomb Threat (U)

(U) The NUMEC Uranium Plant had no procedures for handling bomb threats (Ref. 39).

7.2.5 Civil Disturbance (Riot) (U)

(U) The NUMEC Uranium Plant had no corporate policy to cover security actions in the event of a civil disturbance (Ref. 40).

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7.2.6 Facility Evacuation (U)

(U) During evacuations security was to consist of one three-man team operating under the direction of the Lieutenant of Security on day shift. On weekends or evening shifts, the security policeman (guard) on duty was to be the team leader. Security was to assure that unauthorized personnel were not re-admitted to the plant site immediately following an incident, and, thereafter, assure that areas restricted because of radioactivity were not entered by the general population. Security procedures required the following:

(U) (a) Upon the unannounced sounding of the criticality alarm, one man was to station himself at the south gate and one man was to station himself at the north gate. Normal positions were to be approximately 75 feet from the building to assure a safe exposure. In this position, they were to restrict the entry of unauthorized people.

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(U) (b) The third man was to immediately contact the Zweig property (Raychord Plant and the Apollo Mill) to assure that all personnel there are evacuated safely.

(U) (c) When a criticality had been verified by Health and Safety, the team leader was to immediately call the local and state police requesting support for further traffic control should it become necessary.

(U) (d) This additional area where traffic was to be controlled or restricted was to be established by the Emergency Coordinator based on information obtained from the Group III (health safety) survey.

(U) (e) NUMEC personnel arriving from outside to assist in the emergency were to be directed by the south gate policeman to use the Stanford Warehouse entrance near the NDC (Nuclear Decontamination Corp.) building (Ref. 5).

(1977)

(1964)

7.2.7 Fire or Explosion (U)

(U) The documentation reviewed does not indicate that Security had any responsibilities during the plant evacuation in case of fire or explosion. However, if local fire companies were to arrive at the plant during a fire, the security policeman (guard) was to hold them outside the plant gate until he had been directed by the Fire Marshall or the Health and Safety man to permit them to engage in fighting the fire (Ref. 5).

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7.2.8 Outage of Critical Plant Protection Equipment (U)

(U) Compensatory procedures to be followed if critical plant protection equipment (the local alarm on the truck gate, locks, the guard's weapon, or the commercial telephone) failed to operate are not discussed in the documentation reviewed.

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7.2.9 Multiple Alarm Annunciations (U)

(U) Since the NUMEC Uranium Plant had only one security alarm (the local alarm on the truck gate (Ref. 8)), procedures to deal with this contingency were not required.

7.2.10 Failure of the Alarm System (U)

(U) Compensatory procedures to be followed if the local alarm on the truck gate failed are not discussed in the documentation reviewed.

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7.3 Action Response (U)

7.3.1 Procedure (U)

(U) In the event of a security threat or suspected security threat, the guard was instructed to intercept person(s) gaining or attempting to gain unauthorized access to security areas and to act as necessary in the event of attempts to commit espionage, sabotage, or other criminal acts (Ref. 9).

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7.3 Action Response (U) (Continued)

7.3.2 Use of Force (U)

(U) The degree of force that NUMEC guards were instructed to employ in protecting special nuclear material is not discussed in the documentation reviewed. Since NUMEC expressed concern about the guard force's legal authority to use deadly force in 1969 (Ref. 40), security personnel were probably not expected to use deadly force in 1964.

7.3.3 Response Times (U)

(U) The available documentation reviewed does not include this information. Since the only alarm in use (at the truck gate) did not annunciate at a guard post and since the responding guard could have been as far away as the Parks Township Site (during day shift) or at the Apollo Office Building (during evening shifts) and therefore, might not have been able to hear the alarm, response time is difficult to estimate (Refs. 8, 16).

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7.3 Action Response (U) (Continued)

7.3.4 LLEA Liaison (U)

(U) Liaison was maintained with the Pennsylvania State Police at Westmoreland County, the Apollo and Leechburg Police and the Armstrong County Sheriff's office. This was done as a part of the NUMEC Emergency-Disaster Evacuation dated July 3, 1961, and revised May 1963. In the event of an occurrence requiring roadblocks and/or evacuation routes, these agencies would have been called. This plan did not include provisions for a prearranged response to attempts of unauthorized removal of SNM from the Uranium Plant by one or more individuals (Ref. 39).

7.3.5 MAA Emergency Exit Local Alarms (U)

(U) The NUMEC Uranium Plant emergency exits were not alarmed (Refs. 8, 38, and 39).

SECTION 8 LOCAL LAW ENFORCEMENT AUTHORITIES

SECTION 8.0

LOCAL LAW ENFORCEMENT AUTHORITIES

(1977)[1]

(1964)

[1] Note: All discussion of 1977 physical protection measures in sections 2 through 10 is from Reference 1.

8.1 Size of Force (U)

(U) The documentation reviewed did not describe the response capability of the Pennsylvania State Police, Leechburg Police, or Armstrong County Sheriff's Office. However, the Apollo Police Department had one patrol car which was not equipped with a two-way radio and with which contact could not be effectively made in case of emergency (Ref. 4).

8.2 Types of Assistance (U)

(U) The Emergency-Disaster Evacuation Plan called for police assistance in setting up roadblocks, evacuation routes, or traffic control in the event of a plant accident. It did not include prearranged response to attempts of unauthorized removal of SNM from the plant by one or more individuals (Refs. 5 and 39).

SECTION 8.0

LOCAL LAW ENFORCEMENT AUTHORITIES

(1977)

(1964)

8.3 Arrangements (U)

(U) Liaison and agreements with the Pennsylvania State Police at Westmoreland County, the Apollo and Leechburg Police Departments, and the Armstrong County Sheriff's Office were made in 1961 and renewed in 1963. Apparently no further followup communication was documented until 1972 (Ref. 39).

SECTION 9 TEST AND INSPECTIONS

SECTION 9.0

TESTS AND INSPECTIONS

(1977)[1]

(1964)

[1] Note: All discussion of 1977 physical protection measures in sections 2 through 10 is from Reference 1.

9.1 Physical Barriers (U)

(U) All exterior doors of the Uranium Plant were included in the guard patrols during the off shift (Rf. 7). In addition, daily inspections were made of all NUMEC Facilities by the Guard Lieutenant to assure that all applicable security regulations were being followed. Weekly inspections were made by the Security Manager (Ref. 5).

SECTION 9.0

TESTS AND INSPECTIONS

(1977)

(1964)

9.2 Alarms and Annunciators (U)

(U) The local alarm on the Uranium Plant shipping gates was tested daily by opening the gate (Ref. 8).

SECTION 9.0

TESTS AND INSPECTIONS

(1977) (1964)

9.3 Detectors (U)

(U) Metal, explosive, and SNM detectors were not used at the NUMEC Uranium Plant (Refs. 17, 18, and 22).

SECTION 9.0

TESTS AND INSPECTIONS

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(1964)

9.4 Communications (U)

(U) The telephone was checked during the off shifts through the hourly telephone contact between the Uranium Plant and Plutonium Plant guards (Refs. 8 and 10).

9.5 Other Security Related Equipment (U)

(U) The NUMEC Uranium Plant did not have a silent alarm, local alarms on emergency exits, or Emergency Evacuation Containment Fencing (Refs. 5, 8, 15, and 38).

SECTION 10 SECURITY RECORDS

SECTION 10.0

SECURITY RECORDS

(1977)[1]

(1964)

[1] Note: All discussion of 1977 physical protection measures in sections 2 through 10 is from Reference 1.

10.1 Security Tours, Inspections, and Tests (U)

(U) Records of all activities concerning guard patrols were maintained in a duty log. This included reports of the reason for not covering a Detex Clock key station during the prescribed time together with any incident of security significance. Detex Clock key station tapes were checked weekly by the Guard Lieutenant (Refs. 5, 8, 10, and 13).

10.2 Maintenance (U)

(U) The documents reviewed do not discuss any records of maintenance of security equipment.

10.3 Alarm Annunciations (U)

(U) Annunciations of the local alarm on the truck gate were not recorded automatically (Ref. 16). The documentation reviewed does not discuss whether such alarm annunciations were recorded at all.

SECTION 10.0

SECURITY RECORDS

(1977)

(1964)

10.4 Security Response (U)

(U) Any incident of security significance was to be recorded in the duty log (Ref. 8).

10.5 Authorized Individuals (U)

(U) The documentation reviewed does not explicitly state what records were kept of individuals authorized access to the Uranium Plant. However, sufficient records were kept to enable the receptionist or guard on duty to verify employment and clearance level of facility employees (Ref. 5).

10.6 Employees (U)

(U) The records referred to in Section 10.5 were sufficient to identify plant employees.

10.7 Access to SNM, MAA, and Vital Areas (U)

(U) As mentioned in Section 10.5, records were kept which indicated the employees who were authorized access to the uranium plant. Records of individuals authorized to conduct material transactions with vault custodians were maintained in the vault office (Ref. 5).

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16. ABSTRACT (200 words or less)

The report characterizes the Atomic Energy Commission safeguards requirements and the safeguards systems and procedures in place at the Nuclear Materials and Equipment (NUMEC) uranium processing plant in Apollo, Pennsylvania during the spring of 1964. Based upon this characterization, a list of safeguards weaknesses which would be considered deficiencies under 1979 requirements is developed. Appendixes A and B to the report provide a detailed characterization of AEC safeguards requirements as well as a side by side comparison of NUMEC's safeguards program in 1964 with the safeguards program currently required of a comparable licensed facility. The main report discusses AEC regulatory requirements and philosophy during the mid-1960s, lists the specific areas in which the NUMEC safeguards program would be considered deficient under 1979 NRC requirements, and discusses the conclusions to be drawn from the comparison of the 1964 NUMEC safeguards program with AEC requirements during the mid-1960s and with 1979 NRC requirements. Based upon the deficiencies identified, the report concludes that it is possible that during the mid-1960s significant quantities of high enriched uranium could have been removed from the NUMEC Apollo facility, by a knowledgeable insider or by an outside group with the assistance of an insider, without detection.

17. KEY WORDS AND DOCUMENT ANALYSIS

17a. DESCRIPTORS

NUMEC
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