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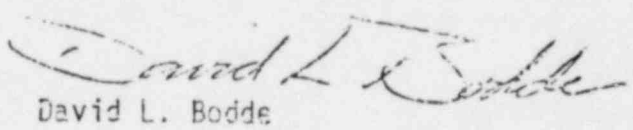
18 January 1977

Mr. Andrew S. Polterak  
Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Mr. Polterak:

Following up our meeting of 12 January and recent telephone discussions, we enclose some thoughts on the structure of the Basic Capabilities.

Yours truly,



David L. Bodde

DLB:bg

cc: L. J. Evans, Jr.

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SOME THOUGHTS REGARDING THE BASIC CAPABILITIESNon-symmetrical Requirements: A Potential Vulnerability

The Basic Capabilities now guard against unauthorized personnel entering a facility. However, licensees would not be required to maintain any capability vis-á-vis unauthorized personnel leaving a facility, provided that these persons carry no SSNM. Thus, an adversary who has breached Capabilities 1 and 2 could, in theory, leave the facility with information on nuclear materials and safeguards systems which would later be employed in a theft, diversion, or sabotage attempt. Of course, this does not matter if we assume that potential adversaries have complete knowledge of the facility anyway. This assumption could be justified by the "insider" threat. But if we are unwilling to make that assumption, we must be concerned with the egress of unauthorized personnel.

Some Options Regarding Capability 4

Depending upon how we define the terms "containment" and "accounting systems", Capability 4 can become unnecessary. This is because breaches in containment would certainly be an unauthorized condition and thereby be subsumed under Capability 2. Similarly, a licensee requires an unbreached accounting system to ensure that SSNM has not been removed except in authorized and confirmed quantities (Capability 3). Thus Capability 4 appears to be a restatement of specific portions of Capabilities 2 and 3. Some options for dealing with this are:

- Discard Capability 4 and include containment and material accounting as specific elements of Capabilities 2 and 3. This would simplify the set of Basic Capabilities and eliminate a difficult definitional problem.
- Retain Capability 4 while defining "containment" and "accounting systems" in ways that clearly segregate them from Capabilities 2 and 3. There are a number of ways in which this might be done. For example:
  - Narrowly define these terms to imply that these safeguards elements are of sufficient importance to warrant their insertion as a Basic Capability.

- Broadly define "containment" in such a way that it includes all safeguards-related conditions. Return Capability 2 to the original Builder concept of "unauthorized conditions of access", which means the mere presence of an unauthorized person regardless of activity.

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#### IV. PLANNING REQUIREMENTS

Generalized performance requirements for the control and protection of SSNM were defined by the task force for coordinated planning with industry, ERDA, and NPC. These requirements were used by the licensees as guidance in preparing proposed plans for improving the safeguards at their facilities.

The planning requirements included, first, a description of the basic functional capabilities deemed essential to assuring the control and protection of SSNM against theft or diversion and, second, a definition of the required degree of assurance against specified adversaries.

##### Basic Capabilities

The basic functional capabilities defined by the task force were intended to assure the protection of SSNM against theft or diversion. They supplement the detailed systems and procedural requirements of 10 CFR Part 73 for the physical security of special nuclear materials. Five basic capabilities to assure the physical security of SSNM were identified. Two of these capabilities relate to the control of access to SSNM, two relate to the containment of SSNM, and the last relates to protection against external assaults. The basic capabilities are those that will assure:

1. admission of only authorized personnel and materials into SSNM access areas,

2. timely detection and effective responses to unauthorized conditions of access to SSNM or unauthorized activities within SSNM access areas,
3. removal of only authorized and confirmed materials from SSNM access areas,
4. timely detection and effective responses to breaches in the containment of SSNM, and
5. timely detection and effective engagement of intruders penetrating protected areas.

The following descriptions are intended to amplify and give examples of the basic capabilities:

Capability 1: Admission of only authorized personnel and materials into SSNM access areas.

Systems and procedures should verify the identity of individuals entering an SSNM access area and exclude unauthorized individuals from these areas. Badge and identification systems can be used to verify the identity of authorized persons. Barriers can be used to restrict unauthorized access. One intent of the statement of capability is to exclude from access areas any materials that could be used to advance the theft of SSNM, except when such materials would be required in an access

area for legitimate and authorized purposes. Appropriate searches or other methods could be used to provide assurance that only authorized materials enter in packages, in vehicles, or on the person of individuals entering.

Capability 2: Timely detection and effective responses to unauthorized conditions of access to SSNM or unauthorized activities within SSNM access areas.

Safeguards should identify and deal with any conditions in a facility that might permit unauthorized persons to have access to and steal SSNM. Unauthorized access could include having employees in areas where they are not permitted, having unauthorized persons handling SSNM without a desired level of surveillance, or other similar situations. Detection of unauthorized conditions of access might result from the use of various alarm systems or surveillance techniques. Alarm systems such as motion detectors provide one means of detection, while surveillance techniques such as the use of guard patrols, closed circuit television coverage of illuminated protected areas, and two-man rule are also candidates for detecting unauthorized access. Tests can be used to demonstrate the effectiveness of sensor-type systems.

Capability 3: Removal of only authorized and confirmed materials from SSNM access areas.

All SSNM should be kept in its proper locations within access areas except when removal is required for some legitimate purpose; and when required, some means should be provided to confirm that the material actually leaving is that which is supposed to leave.

This capability can be achieved by securing a known quantity of SSNM in a given location to prevent its removal. Barriers, containers, tamper-safing, storage of material not in process, and the use of pressure sensitive alarms to detect removal are several examples of means of securing SSNM. The capability also might involve detection of an attempted unauthorized removal of SSNM by using search procedures. In either case, a potential diverter should not be able to get SSNM outside an approved access area. If used, search procedures should work if the diverter attempts to conceal the material on his person or in some other material or container leaving the area, or if he attempts to shield the material from discovery by SSNM detectors.

Capability 4: Timely detection and effective responses to breaches in the containment of SSNM.

Much of the protection afforded SSNM is likely to be provided by barriers and containers. This capability requires that detection and appropriate response be taken when the security of the SSNM is threatened by one or more of these protective containment structures being breached. Examples of containment breaches include uncovered ventilation ducts which could permit

passage of people or material, breaking of a tamper seal on an emergency exit or material container, a hole in the wall of a vault, an accidental or intentional break in a pipe, siphon from a liquid storage container, or other similar conditions.

Detection methods are likely to be similar to those employed to detect unauthorized access, and might include alarms, surveillance, guard patrols, and inspection of containment structures on a regular basis. If a breach of containment is detected, the appropriate response should correct the situation to the extent that an attempted theft would be prevented or discovered in time to prevent the loss of SSNM.

Capability 5: Timely detection and effective engagement of intruders penetrating protected areas.

An expected sequence of response to an external assault might consist of attempted intrusions being detected, assessed, and delayed by means immediately available until an effective response can be mustered. A number of diverse capabilities could be traded-off against each other to achieve this capability. For example, with sufficiently formidable barriers, it might be possible to have delays which would permit significant reductions in on-site guard forces. Response forces from both on-site and off-site can be used, but their arrival should be timely and effective enough that they would be expected to prevail against the adversary group. Communications of various



types can be used to summon response forces, as long as the capability can be shown to exist in depth.

Factors that might be considered in evaluating the expected effectiveness of response forces include their motivation, training, physical condition, armament, numbers, and protection afforded by defense positions. Defensive positions offer potential advantages to the response forces and, if present, can reduce the total numbers of guards required, help provide additional delay, and compensate to some degree for disadvantages in armament or other factors.

#### Performance Criteria

The safeguard systems designed to provide these capabilities should be expected with high confidence to thwart a theft of SSNM. A theft should be considered successful when the adversary has taken possession of the SSNM free from any immediate interceding actions (engagement or hot pursuit) of the response forces.

The nuclear materials of greatest concern are those which could be used for nuclear explosives. Protection of SSNM should preclude the theft of 2000 grams or more of plutonium or uranium-233, or 5000 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope) in a single theft or continuing series of thefts within a 12 month period. These quantities are judged to be substantially less than that required for the illicit manufacture of a nuclear explosive.

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1<sup>st</sup> 4 capabilities,

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some thoughts on Mon.

Andy

# 1<sup>ST</sup> CAPABILITY - ENTRANCE

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## ~~Standard~~ Procedures

Equipment/Facilities

- 50(b) (3) The physical barrier at the perimeter of the protected area shall be separated from any other barrier designated as a physical barrier within the protected area, and the intervening space monitored or periodically checked to detect the presence of persons or vehicles so that the facility security organization can respond to suspicious activity or to the breaching of any physical barrier.
- 50(d) (2) All emergency exits in each protected area and each vital area shall be alarmed.
- 60 (c) Detection aid requirement. Each unoccupied material access area shall be locked and protected by an intrusion alarm on active status. All emergency exits shall be continuously alarmed.

- 50 (c) Access requirements. The licensee shall control all points of personnel and vehicle access into a protected area, including shipping or receiving areas, and into each vital area. Identification of personnel and vehicles shall be made and authorization shall be checked at such points.
- 57(c) (4) Access to vital areas and material access areas shall be limited to individuals who are authorized access to vital equipment or special nuclear material and who require such access to perform their duties. Authorization for such individuals shall be provided by the issuance of specially coded numbered badges indicating vital areas and material access areas to which access is authorized. Unoccupied vital areas and material access areas shall be protected by an active intrusion alarm system.
- 60(f) (5) Admittance to a material access area shall be under the control of authorized individuals and limited to individuals who require such access to perform their duties.
- 60(a) (6) Prior to entry into a material access area, packages shall be searched for devices such as firearms, explosives, incendiary devices, or counterfeit substitute items which could be used for theft or diversion of special nuclear material.

# Conditions/Activities - 2<sup>ND</sup> CAPABILITY

Equipment

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- 50(c) (4) Access to vital areas and material access areas shall be limited to individuals who are authorized access to vital equipment or special nuclear material and who require such access to perform their duties. Authorization for such individuals shall be provided by the issuance of specially coded numbered badges indicating vital areas and material access areas to which access is authorized. Unoccupied vital areas and material access areas shall be protected by an active intrusion alarm system.
- 60 (c) Detection aid requirement. Each unoccupied material access area shall be locked and protected by an intrusion alarm on active status. All emergency exits shall be continuously alarmed.
- 50(b) (3) The physical barrier at the perimeter of the protected area shall be separated from any other barrier designated as a physical barrier within the protected area, and the intervening space monitored or periodically checked to detect the presence of persons or vehicles so that the facility security organization can respond to suspicious activity or to the breaching of any physical barrier.
- 50(b) (5) Isolation zones and clear areas between barriers shall be provided with illumination sufficient for the monitoring required by paragraph (b) (3) and (4) of this section, but not less than 0.2 foot candles.

- 60 (a) Access requirements. (1) Special nuclear material shall be stored or processed only in a material access area. No activities other than those which require access to special nuclear material or equipment employed in the process, use, or storage of special nuclear material, shall be permitted within a material access area.
- 60(a) (7) Methods to observe individuals within material access areas to assure that special nuclear material is not diverted shall be provided and used on a continuing basis.
- 50(c) (1) At the point of personnel and vehicle access into a protected area, all individuals, except employees who possess an NRC or ERDA personnel security clearance, and all hand-carried packages shall be searched for devices such as firearms, explosives, and incendiary devices, or other items which could be used for industrial sabotage. The search shall be conducted either by a physical search or by the use of equipment capable of detecting such devices. Employees who possess an AEC personnel security clearance shall be searched at random intervals. Subsequent to search, drivers of delivery and service vehicles shall be escorted at all times while within the protection area.

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50(5) (5) Individuals not employed by the licensee shall be escorted by a watchman, or other individual designated by the licensee, while in a protected area and shall be badged to indicate that an escort is required. In addition, each individual not employed by the licensee shall be required to register his name, date, time, purpose of visit, employment affiliation, citizenship, name and badge number of the escort, and name of the individual to be visited. Except for a driver of a delivery or service vehicle, an individual not employed by the licensee who requires frequent and extended access to a protected area or a vital area need not be escorted provided such individual is provided with a picture badge, which he must receive upon entrance into the protected area and which he must return each time he leaves the protected area, which indicates (i) nonemployee-no escort required, (ii) areas to which access is authorized, and (iii) the period for which access has been authorized.

### 3<sup>rd</sup> CAPABILITY - REMOVAL

50 (b) *Exit requirement.* Each individual, package, and vehicle shall be searched for concealed special nuclear material before exiting from a material access area unless exit is into a contiguous material access area. The search may be carried out by a physical search or by use of equipment capable of detecting the presence of concealed special nuclear material.

50 (c) *Detection aid requirement.* Each unoccupied material access area shall be locked and protected by an intrusion alarm on active status. All emergency exits shall be continuously alarmed.

60 (b) *Exit requirement.* Each individual, package, and vehicle shall be searched for concealed special nuclear material before exiting from a material access area unless exit is into a contiguous material access area. The search may be carried out by a physical search or by use of equipment capable of detecting the presence of concealed special nuclear material.

# 4<sup>TH</sup> CAPABILITY - CONTAINMENT EQUIPMENT PROCEDURES

60 (a) Access requirements. (1) Special nuclear material shall be stored or processed only in a material access area. No activities other than those which require access to special nuclear material or equipment employed in the process, use, or storage of special nuclear material, shall be permitted within a material access area.

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60(a) (3) Special nuclear material not in process shall be stored in a vault equipped with an intrusion alarm or in a vault-type room, and each such vault or vault-type room shall be controlled as a separate material access area.

60(a) (4) Enriched uranium scrap in the form of small pieces, cuttings, chips, solutions or in other forms which result from a manufacturing process, contained in 30-gallon or larger containers, with a uranium-235 content of less than 0.25 grams per liter, may be stored within a locked and separately fenced area which is within a larger protected area provided that the storage area is no closer than 25 feet to the perimeter of the pro-

ected area. The storage area when unoccupied shall be protected by a guard or watchman who shall patrol at intervals not exceeding 4 hours, or by intrusion alarms.

60(a) (4) Enriched uranium scrap in the form of small pieces, cuttings, chips, solutions or in other forms which result from a manufacturing process, contained in 30-gallon or larger containers, with a uranium-235 content of less than 0.25 grams per liter, may be stored within a locked and separately fenced area which is within a larger protected area provided that the storage area is no closer than 25 feet to the perimeter of the pro-

ected area. The storage area when unoccupied shall be protected by a guard or watchman who shall patrol at intervals not exceeding 4 hours, or by intrusion alarms.