

ENCLOSURE "D"

VALUE/IMPACT ASSESSMENT
CONTAINING A
REPORT JUSTIFICATION ANALYSIS
PHYSICAL PROTECTION OF PLANTS AND MATERIALS

EXEMPTIONS AND CONTINUED REGULATORY AUTHORITY
IN AGREEMENT STATES UNDER SECTION 274

Proposed Amendments to §70, §73, and §150

I. The Proposed Action

A. Description

Proposed amendments to 10 CFR Part 73 would require that various Part 50, Part 70 and State licensees including some nonpower reactors, various fuel cycle facilities and many research and teaching institutions possessing, using, or transporting nonself-protecting SNM of moderate or low strategic significance* implement new provisions for physical security. These provisions are equivalent to those standards set out in the International Atomic Energy Agency (IAEA) circular INFIRC/225/Rev. 1.

*"Special nuclear material of moderate strategic significance" means:

- (1) less than a formula quantity of strategic special nuclear material, but in a quantity of more than 1000 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope) or more than 500 grams of uranium-233 or plutonium or in a combined quantity of more than 1000 grams when computed by the equation, $\text{grams} = (\text{grams contained U-235}) + 2 (\text{grams U-233} + \text{grams plutonium})$, or
 - (2) 10,000 grams or more of uranium-235 (contained in uranium enriched to 10 percent or more but less than 20 percent in the U-235 isotope).
- (Continued)

B. Need for the Proposed Action

The publication of recommended physical security requirements for materials of moderate and low strategic importance by the IAEA, INFCIRC/225/Rev. 1, and the participation by the United States in their development, was accompanied by and continues to be accompanied by assessments of domestic safeguards needs related to those materials. It is the staff judgment that the proposed requirements are technically justified as a necessary safeguards upgrading action commensurate with internationally recognized requirements, developed and promulgated with full United States participation.

C. Value/Impact of the Proposed Action

1. NRC Operations

The amendments proposed in this paper would impact NRC resources as follows:

- a. Amendments to physical security plans for an estimated 50 non-power reactor licensees would need to be reviewed. This would require about 3.5 man-years of effort in the Office of Nuclear Reactor Regulation. This effort would be completed by the end of FY 1980. New plans and plan maintenance during the period FY 1981 through 1984 is estimated to require 3.5 man-years of effort in NRR.

(Continued)

"Special nuclear material of low strategic significance" means:

- (1) less than an amount of strategic special nuclear material of moderate strategic significance, as defined above, but more than 15 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope) or 15 grams of uranium-233 or 15 grams of plutonium or the combination of 15 grams when computed by the equation, grams = grams contained U-235 + grams plutonium + grams U-233, or
- (2) less than 10,000 grams but more than 1000 grams of uranium-235 (contained in uranium enriched to 10 percent or more but less than 20 percent in the U-235 isotope), or
- (3) 10,000 grams or more of uranium-235 contained in uranium enriched above natural but less than 10 percent in the U-235 isotope.

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- b. Fuel cycle physical security plans for 8 Category II facilities and 7 Category III facilities, and 20 transportation plans would need to be reviewed. This would require an estimated 6.3 man-years of effort in the Office of Nuclear Material Safety and Safeguards. This effort would be completed by the end of FY 1980. These plans are completely new plans whereas the nonpower reactor plans, referred to above would be modifications of current plans already reviewed and approved by NRR pursuant to §73.40. New fuel cycle plans and plan maintenance during the period FY 1981 through FY 1984 is estimated to require 3.2 man-years of effort in NMSS.
- c. Inspection of these physical security requirements will be included in the currently programmed efforts for the material control and accounting inspectors and health physics inspectors to minimize the impact on IE resources. For those fixed sites not currently covered by any inspection program, one additional man-year and \$25,000 in travel funds would be required. This would provide inspections of Category II facilities once every 2 years and Category III facilities once every 3 years. Three additional man-years and \$75,000 in travel funds would be required to inspect 20 percent of Category II shipments and 10 percent of Category III shipments. One additional man-year would be required to administer the program.

2. Other Government Agencies

Other agencies of the Federal Government will not be involved in the development of plans for responding to detections of thefts of special nuclear material of moderate or low strategic significance. Such agencies as the FBI, DOE and DOD may be involved in search and recovery operations according to their currently defined responsibilities. However, plans for such actions have already been set in motion with regard to possible thefts of strategic special nuclear material and no additional effort would be required with regard to the material protected under the proposed amendments.

3. Industry

Benefits to industry would be improved protection of valuable materials and facilities. Much of the industry is already in substantial conformance with the proposed requirements, having responded to interim guidance on such matters in the case of medium power nonpower reactors, and elsewhere due to the general

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prudent observance of accepted industrial security practices. Promulgation of the proposed requirements would codify widely existent practice.

The impact upon the licensees will be costs incurred to comply with the proposed regulations and fees paid to the NRC to have their security plans amended. Costs and benefits of particular safeguards items are detailed in Annex 1 to this Enclosure D. The affected industry and the development of industry wide cost impacts are described in further detail in Annex 2 to this Enclosure D.

Physical protection requirements for special nuclear material of moderate strategic significance would apply at about 37 facilities. The maximum capital cost per affected facility would be \$3,653 with about \$44,290 per year thereafter in annually recurring costs, assuming the facility has no protection whatever currently in place. However, these maximum cost estimates are very conservative on the high side since many of the licensed facilities do have considerable portions of the required protection already in place. Taking this into account, and also considering that many of the licensees may opt to utilize procedures which would tend to reduce the costs of their physical protection systems, it is then estimated that the capital costs for any given facility are not expected to exceed \$1,884 with a total cost to the industry of about \$69,708. Similarly, annually recurring costs for a facility are more likely to be about \$4,975 with a total cost to the industry of about \$184,076 per year. The bases for these estimates are detailed in Tables 1 and 2 of Annex 1 to this Enclosure D and Tables IV and V of Annex 2 to this Enclosure D.

Physical protection requirements for special nuclear material of low strategic significance would apply to about 61 facilities. The maximum cost per affected facility would be \$2,604 with an annually recurring cost of about \$773 per year (Annex 2 Tables VIII and IX). However, these maximum costs are somewhat conservative since many of these facilities have portions of the required protection in place. Taking this into account, and also considering that some facilities may opt to utilize procedures which would tend to reduce the costs of their physical protection systems, it is estimated that the capital costs per facility are not expected to exceed \$910 with a total cost to industry of \$55,446 with a probable annual cost per facility of \$309 and a total annual cost to industry of \$18,828. The bases for these estimates are detailed in Tables 5 and 6 of Annex 1 to this

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Enclosure D and Tables VIII and IX of Annex 2 to this Enclosure D.

The maximum costs for transportation of special nuclear material of moderate and low strategic significance are \$14,600 capital expenses and about \$1,720 operating expenses. However, estimates for all transportation costs are reduced from these values when less conservative assumptions are made as indicated in Tables 3, 4, 7 and 8 of Annex 1 of this Enclosure D and Tables VI, VII, X, and XI of Annex 2 of this Enclosure D. The resultant low estimates are about \$12,574 for capital costs and \$1,430 for annual recurring costs.

In addition to the costs stated above, some licensees will be required to pay a licensing fee to have their security plans reviewed. Those licensees required to pay a licensing fee are identified in Table XII of Annex 2 of Enclosure D along with the estimated amount they must pay. The total fee impact is approximately \$190,000 which would be collected initially--approximately \$125,000 for Category II and \$65,000 for Category III. Fees listed that are \$2,000 and greater, however, are subject to manpower cost review, (i.e., when review of the plan is complete, the expenditures for professional manpower and support services will be determined and the resultant fee assessed, but in no event will the fee exceed that shown in the schedule,) and because of the possibility of refunds, the net effect of the fee impact may be less than \$190,000. Colleges and Universities required to file plans for research reactors and special nuclear material licenses under the rule would not be subject to fees.

4. Public

No significant adverse impact on the public can be foreseen. The public will benefit in that a more rigorous approach to physical security will have been implemented leading to a higher level of assurance that repeated thefts or attempted thefts of special nuclear materials of moderate and low strategic significance will likely be detected in a timely manner. Further, the proposed amendments support international safeguards and nonproliferation objectives which promise to improve physical security for the affected materials on a global basis. It is not expected that the financial impact on institutional licensees will be so severe as to force them to terminate their licenses or adversely affect their educational programs.

II. Technical Approach

A.1. Technical Alternatives

- a. Specification of detailed technical requirements in the regulations.
- b. Statement of objectives and performance requirements in the regulations leaving technical alternatives to be decided on a site specific basis.

2. Coverage Alternatives

- a. Replacement of strategically significant materials, i.e., Pu in Pu-Be sources with AmO_2 or $^{238}\text{PuO}_2$.
- b. Exemption of small quantities of Pu in Pu-Be type sealed sources from physical protection requirements.

B. Value/Impact of Alternatives

1. With respect to alternatives 1.a and 1.b., many technical alternatives could be specified in the regulations for upgrading physical security and to achieve protection equivalent to the IAEA standards recommended in INFCIRC/225. Although specification of detailed technical alternatives would accomplish safeguards upgrading and demonstrate the U.S. willingness to endorse IAEA standards, other alternatives which could be equally as effective might then be precluded. A statement of objectives and performance requirements will accomplish upgrading safeguards equivalent to IAEA standards recommended in INFCIRC/225 and still permit licensees to select cost effective technical alternatives appropriate to their sites.
2. An alternative, 2.a above, with respect to coverage to be afforded in the regulations which might have applied to some extent as an unavoidable economic consequence of the proposed regulations if Alternative 2.b., above, were not chosen, is the replacement of the entire SNM inventories of some 400 licensees possessing material of low strategic significance, consisting almost exclusively of 1 to 5 curie Pu-Be neutron sources, with sources containing no materials of strategic significance. Pu-Be neutron sources have already been largely replaced in the commercial sector by AmO_2 -Be or $^{238}\text{PuO}_2$ -Be sources. Replacement with such sources would, in some cases, be less expensive than acquisition of the physical

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security requisite to continued possession of Pu-Be neutron sources. Commercially supplied "Standard IAEA Capsule" neutron sources of 1 to 5 curies cost from \$1,400 to \$1,900 for ^{238}Pu -Be and from \$1,600 to \$2,900 for AmO_2 -Be. This alternative might have been elected by many affected licensees. Others may simply have elected disposal of the sources and license terminations. Either alternative would involve processing of license amendments by NRC and/or various State licensing authorities and repossession of the leased ^{239}Pu by the DOE at its Mound Laboratories.

3. The IAEA recognized in INFCIRC/225 the possibility that "research type facilities outside the nuclear fuel cycle and corresponding shipments may not be able to meet the recommendations. In such cases the State's physical protection system may make specific exceptions on a case-by-case basis." The overwhelming majority of licensees affected by the proposed regulations are "research type facilities outside the nuclear fuel cycle" and are, in fact, mostly universities. The larger university facilities possess research reactors and related facilities and the smaller ones possess one or more Pu-Be neutron sources. The economic impacts of the proposed regulations could be substantially reduced by exempting some or all research type facilities. However, nonpower reactor facilities are, for the most part, already protected to levels commensurate with the proposed regulations and such protection is largely regarded as only prudent and necessary for industrial security and for protection from sabotage and theft of valuable equipment, etc., other than SNM.

Small inventories of SNM consisting only of one or a few sealed Pu-Be sources and, perhaps, an even smaller quantity of Pu or U-235 in sealed fission foils or neutron detectors characterize almost 500 licensees. Those are typically universities which may be ill equipped to bear the expense of acquiring alarmed intrusion detection systems but who generally already control access to those materials with locked storerooms and or locked neutron irradiators. The exception, as stated in 2.b above, to the requirement for further physical protection for those materials would relieve individual licensees of at least \$2,200 new capital expenditure and \$700 per year operating costs each. Thefts or other losses of such materials are already required to be reported and any attempt to gather greater than formula quantities by a series of thefts would be impossible due to the limited amounts of such material in existence. Such an exception is judged to not

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drastically compromise either the furtherance of our international safeguards objectives or effective domestic safeguards.

C. Decision on Technical Approach

Alternatives 1.b and 2.b are judged to be the most cost effective.

III. Procedural Approach

A. Procedural Alternatives

Upgraded physical security for use and transportation of materials of moderate or low strategic significance could be effected several ways. Some of those are:

1. Issue guides with detailed criteria and implement on a case-by-case basis. This has been the practice with many medium power nonpower reactors except that the guides were not formally promulgated.
2. Issue guides with detailed criteria and revise regulations to include physical security objectives and performance criteria equivalent to those of INFCIRC/225.
3. Revise regulations to include all necessary information and detailed criteria to meet physical security requirements.

B. Value/Impact of Procedural Alternatives

All of the procedural alternatives could effect the required upgrading. However, only alternative (2) provides a high visibility endorsement of IAEA and would be the most effective in furthering international safeguards. Alternative (1) suffers from having less than the appearance of law and would require extensive negotiations with affected licensees. Alternative (3) would put an unseemly amount of detail into the regulations.

C. Decision on Procedural Approach

Alternative (2) is judged to be the most desirable of the alternative procedural approaches.

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IV. Report Justification Analysis

A. Need for Rule Amendments

The proposed amendments are in the interest of national security to assure protection of public health and safety and are for the purpose of protection against theft of special nuclear material of moderate and low strategic significance.

The need for the U.S. adoption of the proposed amendments is contingent on both domestic and international factors, which are closely interrelated. Current NRC physical protection regulations apply primarily to strategic special nuclear material (uranium enriched in the isotope U-235 to 20% or greater, U-233, and plutonium) in quantities of five formula kilograms or greater. There are no specific physical protection requirements for quantities in lesser amounts. Yet, it can be properly argued that a 4.9 formula kilogram quantity of SNM is about as important a quantity as 5.0 formula kilograms. Multiple thefts of such materials in close to formula quantities could result in the accumulation of more than a formula quantity.

In regard to low enriched uranium (LEU) (enrichments less than 20%), clandestine enrichment to higher levels may go beyond the capability of subnational terrorists, but it does not go beyond the capability of other governments. Unless properly safeguarded, LEU could be stolen on behalf of foreign governments and enriched to explosive useable levels after it is smuggled out of the U.S.

The Nuclear Non-Proliferation Act of 1978 specifies that NRC shall promulgate regulations which assure that physical security measures are provided to special nuclear materials exported from the United States without specifying whether the materials are LEU or HEU. Pursuant to this legislation, the Commission has promulgated 10 CFR Part 110.43 which provides among other things that:

"(b) Commission determinations on the adequacy of physical security programs in recipient countries for Category II and III quantities of material will be based on available relevant information and written assurances from the recipient country or group of countries that physical security measures providing as a minimum protection comparable to that set forth in INFCIRC/225 will be maintained."

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While the proposed amendments would provide a needed extension of domestic physical protection to special nuclear materials for which the level of physical protection required was not previously specified, the full value of such protection could not be realized until similar protection is afforded all such material among the nations utilizing such materials. Physical protection measures similar to those proposed, which are based on the recommendations of the IAEA Information Circular INFICIRC/225/ Rev. 1, have already been adopted by several countries.

B. Cost/Burden

Costs, the number of licensees, and manhours for particular safeguards items (security plan preparation, response procedure plan preparation, revision and upkeep) are listed in Annex 1 and 2 of this Enclosure D. Other paperwork costs and burden (notice of shipments and receipts and reports on lost or unaccounted for items of shipment) are either of such infrequent occurrence or of such minor effort as to be considered not significant.

C. Alternative Data Sources and Other Alternative Considered

There are no valid alternatives to obtaining the data required for advance shipment notification, reports of results of trace investigation of any shipment lost or unaccounted for and notification regarding a shipment that fails to arrive at its destination. Security plans and response procedures are intended to be well thought out programs which will assure the NRC that each licensee is effectively performing his assigned security related responsibility. Without documented plans approved by the NRC there is no bench mark for either the licensee or the NRC to assure adequate protection.

D. Value/Impact Assessment

Benefit from the recording and reporting requirements will accrue to the licensee, the NRC, and the public. Industry and the licensee will derive benefits in that the requirements for submission of a security plan will motivate the licensee to analyze and identify each security related task. As a part of this analysis he will need to document each physical security objective to minimize the possibility of unauthorized removal of SNM. This action in turn will provide the NRC with a yardstick to measure licensee performance. Thus, the public in general will benefit by assurance of an adequate protection system.

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E. Requirements

The reporting requirements or paperwork burden will include security plans, response procedures, advance notifications, reports of results of trace investigation of any shipment lost or unaccounted for and notification of a shipment that fails to arrive at its destination.

1. 10 CFR Part 70, §70.22(g) will require each application for a license which would authorize the transport, export or delivery to a carrier for transport SNM of moderate strategic significant or 10 kg or more of SNM of low strategic significance (low enriched uranium) to provide a plan for physical protection of intransit material.
2. 10 CFR Part 70 §70.22(k) will require each application for a licensee to possess or use at any site or contiguous sites subject to control by the licensee quantities and types of SNM of moderate strategic significant or 10 kg or more of low strategic significance (low enriched uranium), other than a license for possession or use of such material in the operation of a nuclear power reactor, to include a physical security plan which will demonstrate how the applicant plans to meet general performance objectives to minimize the possibilities for unauthorized removal of SNM consistent with potential consequences of such action; and facilitate the location and recovery of missing SNM.
3. 10 CFR Part 73, §73.47(a) will require a licensee who possesses, uses, or transports SNM of moderate strategic significance or 10 kg or more of SNM of low strategic significance (low enriched uranium) to submit 120 days (four months) from effective date of amendment, a security plan or an amended security plan, including schedules for implementation. The security plan or the amended security plan is to describe how the licensee will comply with the applicable requirements of §73.47.
4. A licensee who transports, exports or delivers to a carrier for transport moderate strategic significance SNM shall:
 - (a) provide advance notification to the Nuclear Regulatory Commission (NRC) and the receiver of any planned shipments specifying the mode of transport, estimated time of arrival, location of the nuclear material transfer

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point, name of carrier and transport identification,
and

- (b) receive confirmation from the receiver prior to the commencement of the planned shipment that the receiver will be ready to accept the shipment at the planned time and location and acknowledges the specified mode of transport.
5. The receiving licensee of SNM of moderate strategic significance shall notify the shipper of receipt of the material and may agree in writing to arrange for the in-transit physical protection.
 6. A licensee who arranges for the physical protection of moderate strategic significance SNM while in transit or who takes delivery of material f.o.b. point of delivery to a carrier for transport shall conduct immediately a trace investigation of any shipment lost or unaccounted for after the estimated arrival time and report the results to the NRC and to the shipper or receiver as appropriate.
 7. A licensee who exports SNM of moderate strategic significance shall:
 - (a) comply with 4.a. and b. above,
 - (b) make arrangements with the consignee to be notified immediately of the arrival of the shipment at its destination, or of any such shipment that is lost or unaccounted for after the estimated time of arrival at its destination, and
 - (c) conduct immediately a trace investigation of any shipment that is lost or unaccounted for after the estimated arrival time and report to the NRC.
 8. Each licensee who imports SNM of moderate strategic significance shall notify the exporter who delivered the material to a carrier for transport of the arrival of the material. In the event a shipment fails to arrive at its destination at the estimated time, the consignee shall notify the NRC and the shipper that the material is missing and shall also notify the Director of the appropriate NRC Inspection and Enforcement Regional Office of the action being taken to trace the shipment.

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9. 10 CFR 73.71, §73.71(a) will require a written report fifteen (15) days after the trace investigation to the appropriate NRC Regional Office setting forth the details and results of the investigation. A copy of the report is to be sent to the Director, Office of Inspection and Enforcement.

V. Statutory Considerations

A. NRC Authority

Section 204(b)(1) of the Energy Reorganization Act of 1974, allots to the NRC the Atomic Energy Act authority for the "provision and maintenance of safeguards against threats, thefts, and sabotage of ... licensed facilities, and materials." The Atomic Energy Act of 1954 as amended provides ample authority for the Commission to require of licensees whatever measures for physical security for materials of moderate or low strategic significance are deemed necessary to protect the public health and safety and the common defense and security.

B. Need for NEPA Assessment

The proposed amendments have an insignificant environmental impact and pursuant to 10 CFR 51(a)(3) require neither an environmental impact statement nor a negative declaration.

VI. Relationship to Other Existing or Proposed Regulations or Policies

There are no apparent potential conflicts or overlaps with other agencies. Coordination with other Federal agencies will be done by the NRC.

VII. Summary and Conclusions

The proposed regulations will both further our international safeguards objectives and effect necessary upgrading of domestic safeguards without working undue hardships on either the licensees or the NRC staff. However, it cannot be predicted with certainty that some small nonfuel-cycle research facilities will not elect to discontinue or markedly amend their operations rather than incur the costs for upgrading.

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ANNEX 1
COST BENEFIT ANALYSIS OF
PROPOSED §73.47 OF 10 CFR PART 73

To estimate the cost to the licensee using or storing special nuclear material of moderate or low strategic significance, several conservative assumptions were made. It was assumed that:

1. the licensee would be using the material in a room 50 ft W x 100 ft L + 20 ft H. This room would have 3 doors entering it. Two of these doors would be fire/exit type doors while the third door would be used for normal personnel entrance. The controlled access area, however, can be made much smaller and can even be considered as the security cabinet or vault-type room for most purposes and at most times.
2. the licensee would want to have a minimum of a 30 foot-candle light level at the work area. This was based on Regulatory Guide 5.14, "Visual Surveillance of Individuals in Material Access Areas." However, the proposed amendments require no quantitative minimum level of illumination in this area.
3. the licensee would not already have onsite a night watchman or guard who could respond to security incidents.
4. it would take the licensee between 2 weeks and one month (depending on the level of security required) to prepare the security plan and one week to prepare the response procedures plan. In both cases, this time could probably be substantially reduced.

Tables 1, 3, 5, and 7 show maximum and probable estimates of the capital cost for implementing the proposed amendment. Tables 2, 4, 6, and 8 give the estimated maximum and probable recurring annual costs once the security system has been implemented. Tables 9, 10, 11, and 12 give the benefits for each of the specific requirements of the proposed amendment.

Table 1

Capital Costs for Security at Facilities
Having Special Nuclear Material of Moderate Strategic Significance

Requirement	Cost to Facility per \$ 73.47	
	Maximum	Probable
1. Door Locks	\$ 940	\$ 940
2. Improved Lighting	\$ 3237	\$ 324
3. Approved Security Cabinet	\$ 410	\$ 410
4. Interior Intrusion Alarm (Monitored Onsite)	\$ 1195	\$ 1195
5. Preauthorization Screening		
a. NAC	\$ 90	\$ 90
6. Badging System	\$ 100	\$ 100
7. Card Key System	\$ 675	\$ 18
8. Security Plan Preparation	\$ 3350	\$ 480
9. Response Procedures Plan Preparation	\$ 770	\$ 96

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Explanation of Table 1

Item

1. Locks - It was assumed that the controlled access area will have 3 doors at its perimeter. Two doors would be emergency type doors requiring emergency breaker strikes costing approximately \$250 each. The third door would be the main entrance and would be equipped with a combination or electric type lock. The cost for a 3-position combination type lock is \$170. Installation time for the 3 locks would be approximately 8 hours costing about \$270.00. Total cost therefore will be approximately $2 \times \$250 + \$170 + \$270 = \940 .
2. Improved Lighting - Although there are no minimum illumination level requirements in § 73.47, for costing purposes we assumed an illumination level of 30 foot-candles throughout the area based on Regulatory Guide 5.14, "Visual Surveillance of Individuals In Material Access Areas." The size of the controlled access area was assumed to be 50' x 100' x 20'. The walls and ceiling were assumed to be painted in a light color with the floor a dark color. A utility firm estimated a minimum of 90 40-watt fluorescent lamps would be needed to obtain a 30 foot-candle level.

Fluorescent lamps cost approximately \$1.50 each. A 2' x 4' fixture which contains 4 lamps was assumed to be used. These fixtures cost approximately \$75 each. Installation costs, including the wiring for 22 fixtures needed to obtain a 30 foot-candle light level, would be about \$1452. (NOTE: Fluorescent lamps were chosen since it was assumed most facilities were already equipped with them. However, High Pressure Sodium Vapor lamps might prove more cost effective in the long run.)
Total Maximum Cost = $(90)(\$1.50) + (22)(\$75) + \$1452 \cong \3237.00

A lower cost estimate can be obtained by consideration of the guidance relating to the lighting requirement. No minimum level of illumination is specified as was mentioned above. The level of illumination must be sufficiently uniform and bright to detect penetration of or tampering with the CAA or unauthorized activities within or penetration of the CAA, depending upon the configuration of the CAA (whether vault-type room or security cabinet). Thus, it is within the control of the licensee to define the CAA in such a way that normal lighting could suffice to meet the lighting requirement in the proposed rule. In this case the additional cost of lighting would be zero. However, some licensees might want to add some additional lighting to

improve inadequately lighted CAA's. It is estimated that an improvement of 10% in the existing lighting system would satisfactorily meet the requirement. Probable cost = 10% x Maximum cost = \$324.00.

3. Approved Security Cabinet - It was assumed that some facilities would have only small quantities of moderate or low strategic significance material which could then be stored in approved security cabinets. The cheapest class and the one used by NRC for protecting classified documents is a GSA class #6 security cabinet. The price of a 2-drawer legal size version is about \$410 and a 4-drawer legal size version is about \$650. (Note: GSA approved security cabinets are cheaper than nonapproved cabinets because of the large number purchased by the government thus reducing their unit cost.)

Generally, however, an approved security cabinet would be used as a substitute for the need to secure an entire area, such as a laboratory, using appropriately designed door locks. Thus both the door locks and the security cabinet would not both be required. For purposes of the low cost estimate, it is assumed although the security cabinet may not be appropriate in all cases some licensees would still purchase them.

4. Interior Intrusion Alarm - It was assumed that 3 balanced magnetic switches and a volumetric ultrasonic detector with 4 slave units would be needed to provide protection to the 50' x 100' x 20' controlled access area. The onsite security organization was assumed to have a guard station where the alarm system would be monitored. It was also assumed a simple D.C. line supervisory system would be needed to monitor the area. Costs of purchasing and installing the equipment for one year are as follows:

1. Ultrasonic detector	\$140
2. 4 slave units	\$120
3. 3 Balanced Magnetic Switches	\$125
4. D.C. line supervisory	\$450
5. Installation	\$360
Total	<u>\$1195</u>

The intrusion alarm system may be substituted for by a program of periodic surveillance by security personnel as described in the guidance. In cases where the licensee already has such personnel in his service, this alternative would represent the most cost effective means of fulfilling the detection requirement. The cost of providing the periodic inspection capability for the sole purpose of detecting intruders would be much more

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than the cost of the interior intrusion alarm system. However, since the 37 facilities which would be covered under the proposed amendments for special nuclear material of moderate strategic significance are known all to have onsite physical security forces, the requirement for either interior intrusion alarms or security procedures might be satisfied more economically using security procedures.

5. Preauthorization Screening - Two types of screening services were investigated. The first is a National Agency Check (NAC) which costs \$15/person. Assuming 6 people will require such a check, this would cost the licensee \$90. The second type of check would be a credit-employment check. The commercial credit investigative service we checked with charges \$75 per year plus \$2.25/person for a credit check, plus \$7.35/person for an employment check going back 2 years. Assuming 6 people require such a check, the licensee would pay $75 + (6)(2.25 + 7.35) \cong \135 a year. Since the NAC check was less expensive, it was chosen.

The guidance indicates that the licensee's present routine screening procedures for hiring personnel or selection of students for admission may be sufficient for meeting the requirements for preauthorization screening. Although most licensees presently employ some screening process for this purpose already, the probable estimate assumes that some additional administrative or screening might be required which would be comparable to the NAC check in cost.

6. Badging System - Since the number of people requiring a badge is small, it was assumed the licensee would have his badge designed and made by a commercial firm. The design and printing of 200 badges costs approximately \$70.00. The cost of taking a photograph of each person and placing it in the badge costs approximately \$5 each. Therefore, the first year the licensee should expect to pay approximately $\$70 + (6)(\$5) = \$100$.
7. Card Key System - A simple magnetic card key system, in which the authorized individual places a magnetic key card in a slot at the door to unlock the door, is assumed as probably the most efficient way of limiting access to authorized employees. Cost of such a system is:

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1. Card Reader	\$214
2. Electric Strike	\$200
3. Transformer	\$ 50
4. Installation Cost (\$33/hour)	\$200
5. (6) Plastic Laminate Cards @ \$1.25 each	<u>\$ 7.50</u>
Total Maximum Cost =	\$671.50 \cong \$675

Since the proposed amendments do not specifically require a card-key system, and access control can be effected through the use of appropriate procedures, no card key system is necessary. Thus, the low estimate for this item is zero. A probable cost would be to issue door keys to the 6 authorized individuals costing \$3/ea for a total probable cost of \$18.00.

8. Security Plan Preparation - It is assumed a maximum of (1) person-month will be required to prepare the security plan. Based on one person-year costing \$40,000, one person-month will cost a maximum of $\$40,000 \div 12 \cong \3350 .

In light of the guidance for the proposed amendments, the time for completion of the physical security plan can be expected to be very much less than one month. A less conservative estimate would be one person-week. Also, it can be assumed that the bulk of the labor involved in the preparation of the plan would be capable of being done by lower paid individuals. It is, therefore, estimated that the average expense of labor to prepare the plan would be about \$25,000 per person-year. The low estimate for plan preparation is, thus, $\$25,000 \div 52 \text{ weeks} \times 1 \text{ week} = \480 .

9. Response Procedures Plan Preparation - It is assumed a maximum of (1) person-week will be required to prepare the plan. Based on a person-year costing \$40,000, one person-week will have a maximum cost of: $\$40,000 \div 52 \cong \770 .

Based upon the guidance, the preparation of a response procedures plan should require only a minimal effort of about one day. The mix of labor assumed to prepare this aspect of the security plan is the same as that for the low estimate for the physical security plan as a whole or \$25,000/person year. Thus, the low estimate for response procedures plan preparation is $\$25,000 \div 52 \text{ weeks} \times 1 \text{ day (or fifth of a week)} = \96 .

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Table 2

Annual Recurring Costs for Physical Security
at Facilities Having Special Nuclear Material of
Moderate Strategic Significance

Requirement	Annual Cost to Facility	
	Maximum	Probable
1. Locks	\$ 94	\$ 94
2. Lighting	\$ 178.50	\$ 32
3. Security Cabinets	\$ 41	\$ 0
4. Interior Intrusion Alarms	\$ 260	\$ 260
5. Badging System	\$ 10	\$ 10
6. Card Key System	\$ 67.50	\$ 6
7. Preauthorization Screening		
a. NAC	\$ 30	\$ 30
8. Security Organization		
a. Watchman	\$43,000	\$43,800
9. Security Plan Revisions	\$ 335	\$ 48
10. Response Procedures Plan Revisions	\$ 77	\$ 10

520 215

Explanation of Table 2

1. Based on a draft copy of a MITRE report, MTR-3541, prepared for the NRC entitled "An Evaluation of Cost Estimates of Physical Security Systems for Recycled Nuclear Fuel," an annual maintenance and service cost of 10% of initial hardware cost was used to determine the maximum annual recurring costs for the following items:

A. Locks	10% x \$940 = \$94
B. Lighting	10% x \$1785 = \$178.50
C. Security Cabinets	10% x \$410 = \$41
D. Card Key System	10% x \$675 = \$67.50

The corresponding low estimates for these items would be:

A. Locks	10% x \$940 = \$94
B. Lighting	10% x \$324 = \$32
C. Security Cabinets	0
D. Card Key System	2 (keys replaced each year) x \$3 = \$6

2. A commercial central alarm service would cost approximately \$260 for annual maintenance and service.
3. For the Badging System and the Preemployment Screening it was assumed that the facility would have an average of 33% turn-over rate per year in personnel or 2 new individuals per year. Therefore, recurring costs are based on this figure.

A. Badging System	(2) x \$5/individual = \$10
B. Preauthorization Screening	
a. Maximum (NAC)	2 x \$15/person = \$30
b. Probable	2 x \$15/person = \$30

3. To provide a 24-hour commercial armed guard service at the facility costs approximately \$5.50/hour which includes the uniform and service revolver. To provide a 24-hour watchman, or unarmed guard, service at a facility costs approximately \$5.00/hour. Therefore, a year's guard service will cost approximately $24 \times 365 \times \$5.50 = \$48,180$ or a year's watchman service will cost approximately $24 \times 365 \times 5 = \$43,800$. Since only a watchman is required, the lower figure was chosen.

This figure appears much larger than necessary if it is recognized that the watchman need not be totally dedicated to the single function of providing a response capability for the controlled access area. All facilities having SNM of moderate strategic significance are

520 216

known to have onsite security forces. Generally, these forces protect nonnuclear facilities belonging to the licensee as well as the nuclear facility. A more accurate treatment of this item would allocate a portion of the cost of the security force needed to support the response capability. Since no new costs are contemplated for such facilities, further refinement of this amount was determined to be unnecessary.

4. It was assumed that 10% of the initial preparation cost of the Security and Response Procedures Plan would be spent each year in revision preparation.

A. Security Plan Revision	10% x \$3350 = \$335
B. Response Procedures Plan Revision	10% x \$770 = \$77

Based upon the low estimate of the corresponding capital costs, the low values for these items annually would be:

A. Security Plan Revision	10% x \$480 = \$48
B. Response Procedures Plan Upkeep	10% x \$96 = \$10

520 217

Table 3

Capital Costs for Implementing § 73.47
 Security Requirements for Transportation of
 Special Nuclear Material of Moderate Strategic Significance

Requirement	Cost	
	Maximum	Probable
1. Seals for Containers	\$ 100	\$100
2. Telephone	-	-
3. Security Plan Preparation	\$1540	\$480
4. Response Procedures Plan Preparation	\$ 770	\$ 96
5. Preauthorization Screening	\$ 90	\$ 90

Explanation of Table 3

1. The licensee is to use tamper indicating seals on containers. The cost of seals, including a sealing device and a lengthy supply of consumable seals, is estimated to cost no more than \$100 (based upon \$.06/seal and \$20 per sealer).

2. A telephone could be used to provide frequent communication with the licensee. This represents no significant additional cost.

3. It is estimated that a maximum of about 2 person-weeks will be required to prepare the security plan. Based on one person-year costing \$40,000, 2 person-weeks will cost $\$40,000 \div 52 \times 2 \cong \1540 .

The probable estimate for preparation of the security plan is about (1) one person-week at a rate of \$25,000 per person-year. This amounts to $\$25,000 \div 52 \text{ weeks} \times 1 \text{ week} = \480 .

4. It was assumed a maximum of 1 person-week will be required to prepare the response procedures plan. Based on one man-year costing \$40,000, one person-week will cost $\$40,000 \div 52 = \770 .

Table 3 (Continued)

The probable estimate assumes only one person-day of effort will be required to complete the response procedures plan at a cost of \$25,000 per person-year. Thus, the estimated low cost would be $\$25,000 \div 52 \text{ weeks} \div 5 \text{ days per week} = \96 .

5. Since an NAC check is less expensive than a commercial credit-employment check, it was chosen. Again as in fixed sites, 6 persons are assumed to require such a check, each costing \$15. Therefore total cost = $6 \times 15 = \$90$.

The probable cost estimate for pre-authorization screening is \$90, consistent with the reasoning provided for the case of fixed sites.

520 219

Table 4

Annual Recurring Security Costs for
Transportation of Special Nuclear Material
of Moderate Strategic Significance

Requirement	Annual Cost [*]	
	<u>Maximum</u>	<u>Probable</u>
1. Seals For Containers	\$ 10	\$ 10
2. Preauthorization Screening	\$ 30	\$ 30
3. Security Plan Revision	\$154	\$ 48
4. Response Procedures Plan Revision	\$ 77	\$ 10

* Explanation for determining these costs are the same as found for Explanation of Table 2.

520 220

Table 5

Capital Costs for Security at Facilities Having
Special Nuclear Material of Low Strategic Significance

Requirement	Cost to Facility per \$ 73.47	
	Maximum	Probable
1. a. Door Locks	\$940	\$940
b. Security Cabinets	\$410	\$410
2. Interior Intrusion Alarm		
a. Monitored Offsite	\$660	\$660
3. Card Key System	\$675	\$ 18
4. Security Plan Preparation	\$3350	\$480
5. Response Procedures Plan Preparation	\$ 770	\$ 96

520 221

Explanation of Table 5

1. a. Door Locks - The same assumptions as to room size and number of doors used for estimating costs of physical security for special nuclear material of moderate strategic significance were used here. See Explanation of Table 1.
- b. Security Cabinets - Could also be used as substitute for door locks. See Explanation of Table 1.
2. Interior Intrusion Alarm - It was assumed in this case that a commercial offsite central alarm service would be used. Costs for alarming a 50' x 100' x 20' room are as follows:

	Equip. Cost	Install. Cost
(1) Master Ultrasonic Detector	140	80
(4) Slave Ultrasonic Detectors	115	80
(3) Balanced Magnetic Switches	125	120
	<hr/>	<hr/>
	380	280

Total Initial Capital
Equipment Cost \$380 + \$280 = \$660

If the facility normally employs a security force as is common at many universities and government and commercial establishments, these personnel can be used at very small marginal cost to perform the detection functions intended to be done by the interior intrusion alarm system. In this case the alarm system hardware would not be necessary.

3. Card Key System - It was assumed that the same type of access control system as used in Table 1 would be used for SNM of low strategic significance. See Explanation of Table 1.

Since the card-key system can be substituted for by appropriate door key or access control procedures the card key system is not necessary and the probable estimate for this item is \$18.

520 222

4. A security plan is required for facilities having more than 10 kg of special nuclear material of low strategic significance. It is estimated that 1 person-month will be required to prepare the security plan. Assuming 1 person-year costs \$40,000, one person-month will cost $\$40,000 \div 12 \cong \3350 .

The low estimate for the preparation of this plan is the same as for the "moderate" case, \$480.

5. Response Procedures Plan Preparation - It was assumed 1 person-week would be required to prepare the response procedures plans. Assuming 1 person-year costs \$40,000, 1 person-week will cost $\$40,000 \div 52 \cong \770 .

The low estimate for this task is the same as for the moderate case, \$480.

520 223

Table 6

Annual Recurring Costs for Physical Security at
Facilities Having Special Nuclear Material of
Low Strategic Significance

Requirements	Annual Cost to Facility	
	Maximum	Probable
1. Door Locks	\$ 94	\$ 94
2. Interior Intrusion Alarm	\$375	\$375
3. Offsite Guard Response	\$240	\$240
4. Card Key System	\$ 68	\$ 6
5. Security Plan Revision	\$335	\$ 48
6. Response Procedures Plan Revision	\$ 77	\$ 10

520 224

Explanation of Table 6

1. Per Mitre report number MTR-3541 entitled "An Evaluation of Cost Estimates of Physical Security Systems for Recycled Nuclear Fuel" door locks, security cabinets, and card key systems are estimated to have a 10 percent of initial cost as recurring maintenance and service cost.
2. A commercial central alarm service would cost approximately \$375 for annual maintenance and service plus leasing costs of the telephone line.
3. A commercial offsite guard response, if tied into a commercial central alarm service, costs about \$240/year.
4. It was assumed that 10% of the initial preparation cost of the Security Plan and Response Procedures Plan would be spent each year in revision preparation.

520 225

Table 7

Capital Costs for Implementing § 73.47 Security Requirements for Transportation of Special Nuclear Material of Low Strategic Significance

Requirement	Cost	
	Maximum	Probable
1. Seals For Containers	\$ 100	\$100
2. Security Plan Preparation	\$1540	\$480
3. Response Procedures Plan Preparation	\$ 770	\$ 96

1. Seals - The licensee is to use tamper-indicating seals on all containers. The cost of seals, including a sealing device and a lengthy supply of consumable seals, is estimated to cost no more than \$100 (based upon \$.06/seal and \$20 per sealer).
2. Security Plan Preparation - It was estimated a maximum of 2 person-weeks would be required. It was assumed 1 person-year costs \$40,000. Therefore, 2 person-weeks = $\$40,000 \div 52 \times 2 \cong \1540 .

The low estimate for preparation of the security plan is about (1) one person-week at a rate of \$25,000 per person-year. This amounts to $\$25,000 \div 52 \text{ weeks} \times 1 \text{ week} = \480 .

3. Response Procedures Plan Preparation - It was assumed 1 person-week would be required. It was also assumed 1 person-year costs \$40,000. Therefore 1 person-week = $\$40,000 \div 52 \cong \770 .

The low estimate assumes only one person-day of effort will be required to complete the response procedures plan at a cost of \$25,000 per person-year. Thus, the estimated low cost would be $\$25,000 \div 52 \text{ weeks} \div 5 \text{ days per week} = \96 .

520 226

Table 8

Annual Recurring Security Costs for
Transportation of Special Nuclear Material
of Low Strategic Significance

Requirement	Annual Cost	
	<u>Maximum</u>	<u>Probable</u>
1. Seals	\$ 10	\$ 10
2. Security Plan Revision	\$154	\$ 48
3. Response Procedures Plan Revisor	\$ 77	\$ 10

Explanation for costs of Table 8 are the same as found for explanation of Table 2.

520 227

Table 9

Benefits of Increased Security for Facilities
Having Special Nuclear Material of Moderate
Strategic Significance

Requirement and Cost	Benefit
1. Door Locks (\$940)	Allows for positive control of personnel access into the controlled area, while still permitting emergency exit from the area. Also allows for high lock security during inactive time periods in area.
2. Improved Lighting (\$3237)	Allows for visual detection of security incidents affecting the safekeeping of this material.
3. GSA Security Cabinet (\$410)	Allows for the safe storage of small quantities of SNM during periods of time when such material is not being used.
4. Interior Intrusion Alarm System (\$1195)	Allows for immediate detection of an intruder entering or moving within the controlled area during unoccupied periods of time so that assistance can be summoned in time for adequate response.
5. Preauthorization Screening (\$90)	Gives the employer assurance of the character of the people who will be working with the material.
6. Badging System (\$100)	Allows fellow employees to quickly ascertain who has been authorized access to the controlled area, thus allowing for more positive access control.

520 228

Table 9

Benefits of Increased Security for Facilities
Having Special Nuclear Material of Moderate
Strategic Significance

(Continued)

Requirement and Cost	Benefit
7. Onsite Guard Service (\$43,800)	Allows for a 24-hour immediate watchman response to security incidents. Also watchman will periodically check packages, escort visitors, patrol the area, monitor alarm system, and communicate security incidents to the appropriate response force.
8. Card Key System (\$675)	Magnetic card keys would be issued to authorized employees. Each time they desired access to the controlled area they would have to insert the card key, thus giving positive control over personnel entering area.
9. Security Plan Preparation (\$3350)	This allows NRC licensors to determine the adequacy of the physical security measures implemented.
10. Response Procedures Plan Preparation (\$770)	Allows the licensee to know in advance what his response should be to any security incident.

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Table 10

Benefits of Increased Security for Transportation
of Special Nuclear Material of Moderate
Strategic Significance

Requirement and Cost	Benefit
1. Locks For Containers (\$2000)	Allows for some deterrence against unauthorized penetra- tion and tampering while the material is in transit.
2. Response Procedures Plan Preparation (\$770)	Allows the licensee to know in advance what his response should be to any security incident.
3. Preauthorization Screening (\$90)	Gives the employer assurance of the character of the people who will be working with the material.
4. Security Plan Preparation (1540)	This allows NRC licensors to determine the adequacy of the physical security measures implemented.

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Table 11

Benefits of Increased Security at Facilities
Having Special Nuclear Material of Low
Strategic Significance

Requirements and Costs	Benefit
1. Door Locks (\$940)	Allows for positive control of personnel access into the area while still permitting emergency exit from the area. Also allows for high lock penetration security during inactive time periods in the area.
2. Interior Intrusion Alarm System (\$660)	Allows for immediate detection of an intruder entering or moving within the controlled area during inactive time period so that assistance can be summoned in time for adequate response.
3. Offsite Guard Response (\$240)	Allows for 24-hour guard monitoring and response to alarms.
4. Card-Key System (\$675)	Magnetic card keys would be issued to authorized employees. Each time they desired access to the controlled area they would have to insert the card key, thus giving positive control over personnel entering the area.
5. Security Plan Preparation (\$3350)	This allows NRC licensors to determine the adequacy of the physical security measures implemented.
6. Response Procedures Plan Preparation (\$770)	Allows the licensee to know in advance what his response should be to any security incident.

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Table 12

Benefits of Increased Security for Transportation of
Special Nuclear Material of Low Strategic Significance

Requirements and Cost	Benefit
1. Locks for Containers (\$2000)	Allows for some deterrence against unauthorized penetration and tampering while the material is in transit.
2. Security Plan Preparation (\$1540)	This allows the NRC licensors to determine the adequacy of the physical security measures implemented.
3. Response Procedures Plan Preparation (\$770)	Allows the licensee to know in advance what his response should be to any security incident.

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ANNEX 2

The Affected Industry and Industrywide Costs

The affected industry handling materials of moderate strategic significance (Category II) consists of about 37 licensees, all except 8 of which are primarily nonpower reactor operators. Those 37 facilities are identified in Table II. The industry handling materials of low strategic significance (Category III) consists of fabricators of low enriched uranium fuels, lower powered nonpower reactor facilities, and research facilities using a few ^{to} hundreds of grams of plutonium or U-235 in various enrichments. Identification of the industry handling materials of low strategic significance is given in Table III. A survey of licensees revealed that, of 60 respondees, only 13 did not already have intrusion alarms. In view of internal interim guidance for security plans for medium power nonpower reactors, which has been used by NRR since 1974 and which calls for intrusion alarms for such facilities, it is felt that almost all nonpower reactor facilities in the moderate category already have intrusion alarms and most of the other provisions for physical security which would be required by the proposed regulations. All licensees possessing material of moderate strategic significance already have onsite physical security forces.

Overall cost impacts of the proposed regulations to industry are estimated to range from a probable \$137,728 to a maximum of \$308,605 capital costs and from a probable \$204,334 to a maximum of \$1,687,600 annual costs. The lower estimates are based upon knowledge of what protection already exists.

Costs elements for facilities possessing special nuclear material of moderate strategic significance are assessed in Tables IV through VII, while those for the lower category are assessed in Tables VIII through XI. Each of these tables provide estimates of the maximum costs a facility might incur if there were no physical protection resources currently in place, as well as lower cost estimates which take into account knowledge of what resources currently are known to be in place at the different types of facilities. Table summarizes the probable cost impacts expected to be experienced by the entire industry.

In addition to the costs stated above, some licensees will be required to pay a licensing fee to have their security plans reviewed. Those licensees required to pay a licensing fee are identified in Table XII along with the estimated amount they must pay. The total fee impact is approximately \$190,000 which would be collected initially--approximately \$125,000 for Category II and \$65,000 for Category III.

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TABLE I
 EXPECTED INDUSTRY INCREMENTAL IMPLEMENTATION COSTS

	<u>Capital Costs</u>	<u>Annual Recurring Costs</u>
<u>Fixed sites</u>		
Moderate	\$ 69,708	\$184,076
Low	55,446	18,828
<u>Total Fixed Sites</u>	<u>\$ 125,154</u>	<u>\$202,904</u>
<u>Transportation</u>		
Moderate	\$ 7,566	\$ 926
Low	5 08	504
<u>Total Transportation</u>	<u>\$ 12,574</u>	<u>\$ 1,430</u>
<u>Average Cost Per Facility</u>		
Moderate		
a. Fixed Site	\$ 1,884	\$ 4,975
b. Transportation	\$ 630	\$ 77
Low		
a. Fixed Site	\$ 910	\$ 309
b. Transportation	\$ 626	\$ 63

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Table II

LICENSEES HAVING SNM OF MODERATE STRATEGIC SIGNIFICANCE (CATEGORY II)

<u>Non-Power Reactors: (Total 29)</u>	<u>License Numbers*</u>
Babcock and Wilcox - Lynchburg	R-47, CX-10
General Atomic	R-38, R-67
General Electric - Vallecitos	TR-1; R-33
Union Carbide	R-81
Massachusetts Institute of Technology	-x
Georgia Tech	x
University of Michigan	Ex
Rhode Island AEC	Ex
Oregon State University	Ex
Texas A&M	Ex
University of Wisconsin	Ex
Washington State University	Ex
University of California - Los Angeles	Ex
Virginia Polytechnic Institute	Ex
University of Missouri/Rolla	Ex
University of Washington	Ex
SUNY at Buffalo	Ex
Lowell Technical Institute	Ex
Worcester Polytechnic Institute	Ex
Ohio State University	Ex
Manhattan College	Ex
University of Kansas	Ex
Purdue University	Ex
University of California - Santa Barbara	Ex
North Carolina State University	Ex
University of Florida	Ex
University of Missouri - Columbia	Ex
University of Virginia	Ex
Iowa State University	Ex
<u>Other Than Non-Power Reactors (Total 8)</u>	
Naval SWC	Ex
Intelcom Industries	SNM-1405
David Witherspoon, Inc.	SNM-952
Eastman Kodak	SNM-1513
Teledyne Isotopes, Inc. - Westwood	SNM-107
NBS (in addition to reactor)	Ex
Union Carbide (Tuxedo)	SNM-639
Lowell Technical Institute	Ex

* A license number is given for those licensees which must submit a protection plan and pay fees. Ex means that these plan submittals are exempt from fees.

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Table III

LICENSEES HAVING SNM OF LOW STRATEGIC SIGNIFICANCE (CATEGORY III)

<u>Non-Power Reactors: (Total 21)</u>	<u>License Number*</u>
Northrop Corporation	R-90
DO. Chemical Co.	R-108
Aerotest Operations	R-98
Rockwell International Nuclear Examination Reactor	R-118
North American Aviation Atomic International	R-40
University of Illinois	Ex
Penn. State University	Ex
University of California, Berkeley	Ex
University of California, Irvine	Ex
U.S. Geological Survey	Ex
University of Utah	Ex
Armed Force Radiobiology Research Inst.	Ex
Michigan State University	Ex
University of Texas, Nuc. Reactor Lab	Ex
University of Maryland	Ex
Kansas State University	Ex
University of Arizona	Ex
Reed College	Ex
Veterans Admin. Hospital	Ex
Brigham Young University	Ex
Cornell University	Ex

Other Than Non-Power Reactors:

<u>U-235 20% + Enrichment (Total 33)</u>	<u>License Number*</u>
USNRC Region I King of Prussia	NP
USNRC Region II Atlanta	NP
USNRC Region III Argone, Ill.	NP
Westinghouse Corp., Elec. Tube Div.	NP
U.S. Naval Research Lab.	NP
Western Michigan University	NP
Reuter-Stokes, Inc.	NP
Nuclear Battery Corp.	NP
Towson State College	NP
Washington University	NP
Ledoux and Co., Inc.	NP
AVCO Everett Research Laboratory	NP
Hittman Nuclear & Development Corp.	NP
Mallinckrodt Chemical Works	NP
Isotopic Analysis, Inc.	NP
The Boeing Company	NP
Stanford University	NP
1155 Technical Operations Squadron	NP

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Continued:

U-235 20% + Enrichment (Total 33)

License Number*

Isotopes Inc., Teledyne Co., Palo Alto	NP
Nuclear Sources & Services, Inc.	NP
U.S. Naval Postgraduate School	NP
California Inst. of Tech.	NP
NASA	NP
Exxon Research and Engineering Co.	NP
Dept. of Army, Harry Diamond Labs.	NP
Lockheed Missiles and Space Co., Inc.	NP
National Spectrograph Labs, Inc.	NP
General Electric Co., Nuclear Energy	NP
Ballistics Research Laboratories	NP
SUNY at Stonybrook	NP
Lewis Research Center NASA	NP
University of Rochester	NP
Exxon Nuclear Company, Inc.	NP

U-235 10% + but Less than 20% Enrichment (Total 0)

U-235 - Less than 10% Enrichment (Total 7)

License Number*

Westinghouse Corp., Columbia, S.D.	SNM-1107
General Electric Co. Wilmington	SNM-1097
Babcock and Wilcox Lynchburg R&D	SNM-778
Babcock and Wilcox Lynchburg Commercial	SNM-1168
Babcock and Wilcox Apollo	SNM-145
Combustion Engineering - Windsor	SNM-1067
Combustion Engineering - Hematite	SNM-33

* A license number is given for those licensees which must submit a protection plan and pay fees. Ex means that these plan submittals are exempt from fees. NP stands for facilities for which the NMIS records show a September 30, 1978 holding of under 10 kgs of SNM of low strategic significance and hence are not required to submit protection plans but must comply with 10 CFR 73.47.

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Table IV
Material of Moderate Strategic Significance Fixed Site Capital Costs

	Estimated Capital Cost to Facility		Estimated Number of Facilities Requiring		Estimated Industry Capital Costs	
	Maximum**	Probable**	Maximum	Probable	Maximum	Probable
Door Locks	\$ 940	\$ 940	37	21	\$ 34,780	\$ 19,740
Improved Lighting	3,237	324	37	6	11,988	1,944
GSA Approved Security Cabinet*	410	410	37	14	15,170	5,740
Interior Intrusion Alarm Monitored on Site	1,195	1,195	37	14	44,215	16,730
Preauthorization Screening	90	90	37	21	3,330	1,890
Badging System	100	100	37	21	3,700	2,100
Card Key System	657	18	37	14	666	252
Security Plan Preparation	3,350	480	37	37	17,760	17,760
Response Procedure Plan Preparation	770	96	37	37	3,552	3,552
					135,161	69,708
					(\$3,653/fac)	(\$1,884/fac)

Annex 2 to Enclosure "D"

* A security cabinet would probably not be required if the controlled access area already was equipped with door locks, card-key system and intrusion alarm system.

** The dollar totals here represent the maximum cost possible to a licensee and does not give credit in some cases for security subsystems already in place. The probable column is a more realistic estimate of what will be required by industry to meet requirements of 10 CFR 73.47.

Table V

Material of Moderate Strategic Significance Fixed Site Annual Costs

<u>Requirement</u>	<u>Estimated Annual Costs to Facility</u>		<u>Estimated Number of Facilities Incurring</u>		<u>Estimated Industry Incremental Annual Costs</u>	
	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>
Door Locks	\$ 94	\$ 94	37	21	\$ 3,478	\$ 1,974
Improved Lighting	178.50	32	37	6	1,184	192
Security Cabinet	41	0	37	9	0	0
Interior Intrusion Alarms Monitored on Site	260	260	37	14	9,620	3,640
Preauthorization Screening	30	30	37	21	1,110	630
Badging System	10	10	37	21	370	210
Onsite Security Force	43,800	43,800	37	4	1,620,600	175,200
Card Key System	67.50	6	37	14	222	84
Security Plan Revisions	335	48	37	37	1,776	1,776
Response Procedures Plan Revisions	77	10	37	37	370	370
					<u>\$1,638,730</u>	<u>\$184,076</u>
					(44,290/facility)	(\$4,975/facility)

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Annex 2 to Enclosure "D"

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Table VI

Material of Moderate Strategic Significance Capital Costs for Transportation

<u>Requirement</u>	<u>Estimated Capital Cost per Shipper</u>		<u>Estimated Number of Shippers Incurring Incremental Costs</u>		<u>Estimated Incremental Industry Capital Costs</u>	
	<u>Maximum</u>	<u>Probable</u>			<u>Maximum</u>	<u>Probable</u>
Seals for Containers	\$ 100	\$ 100	12	2	\$ 1,200	\$ 24
Telephone	-----	-----	12	0	-----	-----
Security Plan Preparation	1,540	480	12	12	5,760	5,760
Response Procedures Plan Preparation	770	96	12	12	1,152	1,152
Preauthorization Screening	90	90	12	7	1,080	630
					<u>\$ 9,192</u> (\$766/fac)	<u>\$ 7,566</u> (\$630/fac)

Table VII

Materials of Moderate Strategic Significance Annual Costs for Transportation

<u>Requirement</u>	<u>Maximum</u>	<u>Estimated Capital Cost per Shipper</u>		<u>Estimated Number of Shippers Incurring Incremental Costs</u>		<u>Estimated Incremental Industry Capital Costs</u>	
			<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>
Seals for Containers	\$ 10	\$ 10	12	2	\$ 120	\$ 20	
Security Plan Upkeep	154	48	12	12	576	576	
Response Procedures Plan Upkeep	77	10	12	12	120	120	
Preauthorization Screening	30	30	12	7	360	210	
					<u>1,176</u>	<u>926</u>	
					(\$98/facility)	(\$77/facility)	

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Table VIII

Materials of Low Strategic Significance Fixed Site Capital Costs

<u>Requirement</u>	<u>Estimated Capital Cost to Facility</u>		<u>Estimated Number of Facilities Requiring</u>		<u>Estimated Industry Capital Costs</u>	
	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>
Door Locks	\$ 940	\$ 940	61	5	\$57,340	\$ 4,700
Security Cabinet	410	410	61	5	25,010	2,050
Interior Intrusion Alarm Monitored Offsite	660	660	61	20	40,260	13,200
Card Key System	675	18	61	20	1,098	360
Security Plan Preparation (Large LEU Facilities)	3,350	480	61	61	29,280	29,280
Response Procedures Plan Preparation	770	96	61	61	5,856	5,856
					\$ 158,844	\$ 55,446
					(\$2604/facility)	(\$910/facility)

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Annex 2 to Enclosure "D"

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Table IX

Materials of Low Strategic Significance Fixed Site Annual Costs

<u>Requirement</u>	<u>Estimated Capital Cost to Facility</u>		<u>Estimated Number of Facilities Requiring</u>		<u>Estimated Industry Capital Costs</u>	
	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>
Door Locks	\$ 94	\$ 94	61	5	\$ 5,734	\$ 470
Security Cabinet	41	0	61	5	0	0
Interior Intrusion Alarm Monitored Offsite	375	375	61	20	22,875	7,500
Offsite Guard Response	240	240	61	30	14,640	7,200
Card Key System	68	6	61	20	363	120
Security Plan Upkeep (Large LEU Facilities)	335	48	61	61	2,928	2,928
Response Procedures Plan	77	10	61	61	610	610
					<u>47,150</u>	<u>18,828</u>
					(\$773/facility)	(\$309/facility)

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Annex 2 to Enclosure "D"

Table X

Materials of Low Strategic Significance Capital Costs for Transportation

<u>Requirement</u>	<u>Estimated Capital Costs Per Shipper</u>		<u>Estimated Number of Shippers Incurring Incremental Costs</u>		<u>Estimated Incremental Industry Capital Costs</u>	
	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>
Seals for Containers - 20	\$ 100	\$ 100	8	4	\$ 800	\$ 400
Security Plan Preparation (Large LEU Shippers)	1,540	480	8	8	3,840	3,840
Response Procedures Plan Preparation	770	96	8	8	768	768
					<u>\$ 5,408</u> (\$676/facility)	<u>\$ 5,008</u> (\$625/facility)

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Table XI

Materials of Low Strategic Significance Annual Costs for Transportation

<u>Requirement</u>	<u>Estimated Capital Costs Per Shipper</u>		<u>Number of Shippers Incurring Incremental Costs</u>		<u>Incremental Industry Capital Costs</u>	
	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>	<u>Maximum</u>	<u>Probable</u>
Seals for Containers - 20	\$ 10	10	8	4	\$ 80	40
Security Plan Revisions	154	48	8	8	384	384
Response Procedures Plan Revisions	77	10	8	8	80	80
					<u>\$ 544</u>	<u>\$ 504</u>
					(\$68/facility)	(\$63/facility)

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Table XII

IDENTIFIED LICENSEES REQUIRED TO PAY LICENSING FEE
NON-POWER REACTORS

CATEGORY II-
MODERATE STRATEGIC

	<u>Licensee</u>	<u>License No.</u>	<u>Amendment Fee Class</u>	<u>Fee</u>
1.	General Electric	TR-1	4	\$ 6,000
		R-33	1	0
2.	B&W	CX-10	3	2,000
		R-47	1	0
3.	General Atomic	R-67	4	6,000
		R-38	1	0
4.	Union Carbide	R-81	3	2,000
			TOTAL	<u>\$16,000</u>

CATEGORY III-
LOW STRATEGIC

	<u>Licensee</u>	<u>License No.</u>	<u>Amendment Fee Class</u>	<u>Fee</u>
1.	Aerotest	R-98	3	2,000
2.	Dow Chemical	R-108	3	2,000
3.	Northrup	R-90	3	2,000
4.	Rockwell	R-118	3	2,000
5.	North American	R-40	3	2,000
			TOTAL	<u>\$10,000</u>

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Table XII (cont'd)

SNM OF MODERATE STRATEGIC SIGNIFICANCE

CATEGORY II

	<u>Licensee</u>	<u>License No.</u>	<u>Amendment Fee Category</u>	<u>Fee</u>
1.	David Witherspoon	SNM-952	1J	\$ 110
2.	Eastman Kodak	SNM-1513	1J	110
3.	IntelCom Industries	SNM-1405	1D-1F	4,800
4.	Teledyne Isotopes	SNM-107	1G	2,800
5.	Union Carbide	SNM-639	1G	2,800
			TOTAL	<u>\$10,620</u>

SNM OF LOW STRATEGIC SIGNIFICANCE

CATEGORY III

	<u>Licensee</u>	<u>License No.</u>	<u>Fee Category (Minor Sfgds. Amd.)</u>	<u>Fee</u>
1.	B&W - Apollo	SNM-145	1A	\$ 3,500
2.	B&W - Lynchburg	SNM-778	1B	3,500
3.	B&W - Commercial	SNM-1168	1B	3,500
4.	Combustion Engr.	SNM-33	1B-1G	3,500
5.	Combustion Engr.	SNM-1067	1B	3,500
6.	G.E. -Wilmington	SNM-1097	1B	3,500
7.	Westinghouse	SNM-1107	1B	3,500
			TOTAL	<u>\$24,500</u>

Table XII (cont'd)

TRANSPORTATION PLANS

CATEGORY II - MODERATE STRATEGIC

<u>Licensee</u>	<u>License No.</u>	<u>Amendment Fee Category</u>	<u>Fee</u>
B&W Lynchburg - Naval	SNM-42	1A	\$ 8,300
B&W Lynchburg	SNM-414	1C-1G	13,800
Battelle Columbus Labs	SNM-7	1A	8,300
General Atomic Corp.	SNM-696	1A-1F	8,300
Nuclear Fuel Services-Erwin	SNM-124	1A	8,300
Rockwell International	SNM-21	1A-1E	8,300
Texas Instruments	SNM-23	1A	8,300
Union Carbide-Tuxedo	SNM-639	1G	2,800
United Nuclear-Uncasville	SNM-368	1A	8,300
United Nuclear-Wood River Jun.	SNM-777	1A	8,300
National Bureau of Standards	SNM-362		- 0 -
Westinghouse-Cheswick	SNM-1120	1A-1C	<u>13,800</u>
		TOTAL	<u>\$96,800</u>

CATEGORY III - LOW STRATEGIC

<u>Licensee</u>	<u>License No.</u>	<u>Amendment Fee Category</u>	<u>Fee</u>
B&W Lynchburg-Research	SNM-778	1B	\$ 3,500
B&W Lynchburg-Commercial	SNM-1168	1B	3,500
B&W Apollo	SNM-145	1A	3,500
Combustion Engr.-Hematite	SNM-33	1B-1G	3,500
Combustion Engr.-Windsor	SNM-1067	1B	3,500
Exxon Nuclear	SNM-1227	1B-1C	6,200
General Electric-Wilmington	SNM-1097	1B	3,500
Westinghouse-Columbia	SNM-1107	1B	<u>3,500</u>
		TOTAL	\$ <u>30,700</u>

SUBTOTAL CATEGORY II \$123,420SUBTOTAL CATEGORY III \$ 65,200GRAND TOTAL \$188,620

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ENCLOSURE E

NRC AMENDS REGULATIONS ON PROTECTION OF NUCLEAR MATERIALS AND FACILITIES

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ENCLOSURE "E"
NRC AMENDS REGULATIONS ON
PROTECTION OF NUCLEAR MATERIALS AND FACILITIES

The Nuclear Regulatory Commission is amending its regulations for the protection of nuclear materials and nuclear facilities other than power reactors and independent spent fuel storage installations.

The amendments are designed to provide a level of protection against theft of special nuclear material of low and moderate strategic significance equivalent to that recommended in Information Circular/225, which was published by the International Atomic Energy Agency in June 1977.

Special nuclear material of low and moderate strategic significance is not directly usable in the manufacture of a nuclear weapon, but nevertheless could be of assistance in such a project.

Material of moderate strategic significance includes (1) between 500 grams and 2 kilograms of plutonium or uranium-233, (2) between 1 and 5 kilograms of uranium-235 enriched to 20% or more, and (3) 10 kilograms or more of uranium-235 enriched to at least 10% but less than 20%.

Material of low strategic significance includes (1) between 15 and 500 grams of plutonium or uranium-233, (2) between 15 grams and 1 kilogram of uranium-235 enriched to 20% or more, (3) between 1 and 10 kilograms of uranium-235 enriched to at least 10% but less than 20%, and (4) 10 or more kilograms of uranium enriched above its natural state but to less than 10%.

The NRC's new physical protection measures for special nuclear material of low strategic significance basically require that licensees use and store the material in a controlled access areas, monitor the controlled access area to detect unauthorized activities, and transport the material under controlled and planned conditions.

The requirements for material of moderate strategic significance are similar, except that licensees are additionally required to limit access to the material to individuals who have been specifically authorized to have such access.

More specific guidance to licensees on the types of physical security plans for material of low and moderate strategic significance that are acceptable to the NRC staff is contained in a regulatory guide that is being published concurrently with the amendments. Single copies of the guide, entitled "Standard Format and Content for the Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate or Low Strategic Significance," are available without charge by written request to the Director, Division of Technical Information and Document Control, Nuclear Regulatory Commission, Washington, D.C. 20555.

Interested persons are invited to submit comments on the guide within the next 60 days. Comments should be addressed to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

After consideration of the comments received, the guide will be reissued and the amendments, which are to Parts 70, 73 and 150 of the Commission's regulations, will become effective. Licensees will then

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have 120 days to submit their physical security plans to the NRC for approval. The plans would have to be implemented 30 days after approval by the NRC or 360 days after publication of the amendments in the Federal Register on _____.

The amendments were published in proposed form on May 24, 1978, for public comment. Some details of the amendments were changed as a result of the comments received (plutonium-beryllium sealed sources and plutonium containing more than 80% plutonium-238 were exempted from the requirements, and the time period for submission of physical security plans was extended from 60 days to 120 days).

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