

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.
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 minimum light level in this area and therefore would not have to be met.
3. the licensee would not already have onsite a night watchman or guard which could respond to security incidents.

4. it would take the licensee one month to prepare the security plan and one week to prepare the contingency plan. In both cases, this time could probably be substantially reduced.

Tables 1, 3, 5, and 7 show the capital cost for implementing the proposed amendment. Tables 2, 4, 6, and 8 give the estimated 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
1. DOOR LOCKS	\$ 940
2. IMPROVED LIGHTING	\$ 3237
a. 30 ft. Candle Level	
3. GSA SECURITY CABINET	\$ 410
4. INTERIOR INTRUSION ALARM	
a. Monitored Onsite	\$ 1555 ² 1195
5. PREEMPLOYMENT SCREENING	
a. NAC	\$ 90
6. BADGING SYSTEM	\$ 100
7. CARD KEY SYSTEM	\$ 675
8. SECURITY PLAN PREPARATION	\$ 3350
9. CONTINGENCY PLAN PREPARATION	\$ 770

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 lighting level requirements in § 73.47, for costing purpose 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. Pepco 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 Cost = (90)(\$1.50) + (22)(\$75) + \$1452 = \$3237.00

3. GSA Security Cabinet - It was assumed that some facilities would have only small quantities of moderate or low strategic material which could then be stored in GSA 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 non-approved cabinets because of the large number purchased by the government thus reducing their unit cost.)

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, installing, and maintaining the equipment for one year are as follows:

1. Ultrasonic dectector	\$140
2. 4 slave units	\$120
3. 3 Balanced Magnetic Switches	\$125
4. D.C. line supervisory	\$450
5. Installation	\$360
6. Maintenance	\$360
Total	\$1555
	\$1195

5. Preemployment 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) = \135 a year. Since the NAC check was less expensive, it was chosen.

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:

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>
	\$671.50 \approx \$675

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

9. Contingency Plan Preparation - It is assumed approximately 1 man-week will be required to prepare the contingency plan. Based on a man-year costing \$40,000, one man-week will cost:
$$\$40,000 \div 52 \approx \$770.$$

TABLE 2: ANNUAL RECURRING COSTS FOR PHYSICAL SECURITY
 AT FACILITIES HAVING SPECIAL NUCLEAR MATERIAL OF
 MODERATE STRATEGIC SIGNIFICANCE

REQUIREMENT	ANNUAL COST TO FACILITY
1. LOCKS	\$ 94
2. LIGHTING	\$ 178.50
3. SECURITY CABINETS	\$ 41
4. INTERIOR INTRUSION ALARMS	\$ 155.50 2.60
5. BADGING SYSTEM	\$ 10
6. CARD KEY SYSTEM	\$ 67.50
7. PREEMPLOYMENT SCREENING	
a. NAC	\$ 30
8. SECURITY ORGANIZATION	
a. Watchman	\$43,800
9. SECURITY PLAN REVISIONS	\$ 335
10. CONTINGENCY PLAN REVISIONS	\$ 77

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 annual recurring costs for the following items:

A. Locks	$10\% \times \$940 = \94
B. Lighting	$10\% \times \$1785 = \178.50
C. Security Cabinets	$10\% \times \$410 = \41
D. Interior Intrusion Alarm	$10\% \times \\$1555 = \\155.50
D. E. Card Key System	$10\% \times \$675 = \67.50

2. *INSERT A*

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) \times \$5/\text{individual} = \10
B. Preemployment Screening	
a. NAC	$2 \times \$15/\text{person} = \30

INSERT A

2. A commercial central alarm service would cost approximately \$260 for ¹⁰annual maintenance and service.

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.

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

A. Security Plan Revision	$10\% \times \$3350 = \335
B. Contingency Plan Revision	$10\% \times \$770 = \77

TABLE 3: CAPITAL COSTS FOR IMPLEMENTING § 73.47
 SECURITY REQUIREMENTS FOR TRANSPORTATION OF
 SPECIAL NUCLEAR MATERIAL OF MODERATE STRATEGIC SIGNIFICANCE

REQUIREMENT	COST
1. LOCKS FOR CONTAINERS	\$2000
2. TELEPHONE	-
3. CONTINGENCY PLAN PREPARATION	\$ 770
4. PREEMPLOYMENT SCREENING	<u>\$ 90</u>
TOTAL	\$2860

EXPLANATION OF TABLE 3

1. It was assumed that 20 locks costing approximately \$100 each would be required. The number of locks required is a conservative estimate since most licensees affected by the proposed amendment have very few shipments annually. $20 \times \$100 = \2000

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

3. It was assumed approximately 1 man-week will be required to prepare the contingency plan. Based on one man-year costing \$40,000, one man-week will cost $\$40,000 \div 52 = \770 .

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

TABLE 4: ANNUAL RECURRING SECURITY COSTS FOR
TRANSPORTATION OF SPECIAL NUCLEAR MATERIAL
OF MODERATE STRATEGIC SIGNIFICANCE

REQUIREMENT	ANNUAL COST*
1. LOCKS FOR CONTAINERS	\$200
2. PREEMPLOYMENT SCREENING	\$ 30
3. CONTINGENCY PLAN REVISION	<u>\$ 77</u>
TOTAL	\$307

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

TABLE 5: CAPITAL COSTS FOR SECURITY AT FACILITIES HAVING
SPECIAL NUCLEAR MATERIAL OF LOW STRATEGIC SIGNIFICANCE

REQUIREMENT	COST TO FACILITY PER § 73.47
1. DOOR LOCKS	\$940
2. INTERIOR INTRUSION ALARM	
a. Monitored Offsite	\$660
3. CARD KEY SYSTEM	\$675
4. CONTINGENCY PLAN PREPARATION	<u>\$770</u>
TOTAL	\$3045

EXPLANATION OF TABLE 5

1. 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 was used here. 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. (1) Master Ultrasonic Detector	140	80
2. (4) Slave Ultrasonic Detectors	115	80
3. (3) Balanced Magnetic Switches	125	120
4. Leasing Telephone Line	—	—
	380	280
TOTAL INITIAL CAPITAL EQUIPMENT COST	\$380 + \$280 = \$660	

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.

4. Contingency Plan Preparation - It was assumed 1 man-week would be required to prepare the contingency plans. Assuming 1 man-year costs \$40,000, 1 man-week will cost $\$40,000 \div 52 \approx \770 .

TABLE 6: ANNUAL RECURRING COSTS FOR PHYSICAL SECURITY AT
 FACILITIES HAVING SPECIAL NUCLEAR MATERIAL OF
 LOW STRATEGIC SIGNIFICANCE

REQUIREMENTS	ANNUAL COST TO FACILITY
1. DOOR LOCKS	\$ 94
2. INTERIOR INTRUSION ALARM	\$375
3. OFFSITE GUARD RESPONSE	\$240
4. CARD KEY SYSTEM	\$ 68
5. CONTINGENCY PLAN REVISION	\$ 77
TOTAL	<u>\$854</u>

EXPLANATION OF TABLE 6

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.

A commercial central alarm service would cost approximately \$375 for annual maintenance and service plus leasing costs of the telephone line.

A commercial offsite guard response, if tied into a commercial central alarm service, costs about \$240/year.

Approximately 1/2 man-day annually would be required to revise the contingency plan or 10% of \$770 = \$77.

TABLE 7: CAPITAL COSTS FOR IMPLEMENTING § 73.47 SECURITY
 REQUIREMENTS FOR TRANSPORTATION OF SPECIAL
 NUCLEAR MATERIAL OF LOW STRATEGIC SIGNIFICANCE

REQUIREMENT	COST
1. LOCKS FOR CONTAINERS	\$2000
2. CONTINGENCY PLAN PREPARATION	\$ 770
TOTAL	\$2770

1. Locks - It was assumed 20 locks at \$100 each would be required.
 The number of locks required is a conservative estimate since most licensees affected by the proposed amendment have very few shipments annually. $20 \times \$100 = \2000

2. Contingency Plan Preparation - It was assumed 1 man-week would be required. It was also assumed 1 man-year costs \$40,000.
 Therefore $1 \text{ man-week} = 40,000 \div 52 = \770 .

TABLE 8: ANNUAL RECURRING SECURITY COSTS FOR
TRANSPORTATION OF SPECIAL NUCLEAR MATERIAL
OF LOW STRATEGIC SIGNIFICANCE

REQUIREMENT	ANNUAL COST
1. LOCKS	\$200
2. CONTINGENCY PLAN REVISION	<u>\$ 77</u>
TOTAL	<u>\$277</u>

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

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 (1537)	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 (\$1555) (195)	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. PREEMPLOYMENT 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.

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. CONTINGENCY PLAN PREPARATION (\$770)	Allows the licensee to know in advance what his response should be to any security incident.

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. CONTINGENCY PLAN PREPARATION (\$770)	Allows the licensee to know in advance what his response should be to any security incident.
3. PREEMPLOYMENT SCREENING (\$90)	Gives the employer assurance of the character of the people who will be working with the material.

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 (\$1035) (\$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. CONTINGENCY PLAN PREPARATION (\$770)	Allows the licensee to know in advance what his response should be to any security incident.

TABLE 12: BENEFITS OF INCREASED SECURITY FOR TRANSPORTATION OF
SPECIAL NUCLEAR MATERIAL OF LOW STRATEGIC SIGNIFICANCE

REQUIREMENTS AND COSTS	BENEFIT
1. LOCKS FOR CONTAINERS (\$2000)	Allows for some deterrence against unauthorized penetration and tampering while the material is in transit.
2. CONTINGENCY PLAN PREPARATION (\$770)	Allows the licensee to know in advance what his response should be to any security incident.

CATEGORY II AND III MATERIALS RULE

LIST OF COMMENTERS

NO.	COMMENTER	ID CODE	DATE RECEIVED
1	Monsanto Research Corporation	MRC	6/06/78
2	Texas A&M University, Nuclear Eng'g. Dept.	TAMU	6/16/78
3	State University of New York at Buffalo, Nuclear Science and Technology Facility	SUNY	6/19/78
4	Virginia Polytechnic Institute and State University	VPI	6/19/78
5	Rhode Island Atomic Energy Commission, Nuclear Science Center	RI/AEC	6/22/78
6	National Bureau of Standards (Reactor Radiation)	NBS	6/22/78
7	University of California, Santa Barbara	UC/SB	6/22/78
8	University of Michigan, Phoenix Memorial Laboratory	UM	6/22/78
9	Conner, Moore & Corber, Law Offices	CMC	6/23/78
10	Exxon Nuclear Company, Inc.	EXXON	6/27/78
11	(Comments for wrong rule)		
12	Union Carbide Corporation	UNCAR	6/27/78
13	Pennsylvania State University	PENN	6/27/78
14	Massachussetts Institute of Technology, Nuclear Reactor Laboratory	MIT	6/27/78
15	National Bureau of Standards (Health Physics)	NBS	6/27/78
16	Battelle, Pacific Northwest Laboratories	BPNL	6/27/78
17	University of Illinois at Urbana-Champaign	UILL	6/27/78
18	Oregon State University, Radiation Center	ORSU	6/27/78
19	University of Missouri, Research Reactor Facility	UMO	6/27/78
20	Transnuclear, Inc.	TRNUC	6/27/78

Commenter: MRC

Applicable Section of Proposed Rule: §§73.2(z), (aa)

Comment: Apparently, the proposed regulation... includes Plutonium-238 in its definition of SNM of Low Strategic Significance. The reference IAEA regulations (Table I, Categorization of Nuclear Material) excludes plutonium material having 80% or greater Plutonium-238.

I recommend that the proposed regulation also exclude plutonium containing 80% or more of Plutonium-238 from the safeguards requirements.

Issue: No specific treatment of this departure from IAEA categorization was mentioned in the Statement of Considerations, as were other departures. However, Pu-238 may still be desired to be protected on the basis of the threat of its use in a dispersal weapon. In lieu of argument on this point, the inconsistency should be corrected.

Action: Change definitions in §§73.2(z) and (aa) to reflect the exemption of Pu-238 from the categories of SNM of Moderate and Low Strategic Significance. Alternately, modify the Statement of Considerations to reflect the inclusion of protection of Pu-238 as a departure from the IAEA categorization of materials.

Suggested Resolution of Issue:

- q The Commission did not intend in the proposed rule to protect against a credible plutonium dispersal threat. Thus, the rule should reflect the exclusion of plutonium containing more than 80% of the isotope Pu-238.

Proposed Rule Change:

§73.2(z) revised to read as follows:

(1) Less than formula quantities ... or plutonium (but not in plutonium containing more than 80% of the isotope Pu-238) or ... grams = (grams contained U-235) + 2(grams U-233 + grams plutonium), (not including plutonium containing more than 80% of the isotope Pu-238), or ...

§73.2(aa) revised to read as follows:

(1) Less than an amount of strategic special nuclear material of moderate ... or 85 grams of plutonium. (but not including plutonium containing more than 80% of the isotope Pu-238), or ...



Commenter: TAMU

Applicable Section of Proposed Rule: §73.47(d)(3) and §73.47(f)(2)

Comment: The proposed amendments are vague when applied to a large organization, like a university system, where material under one license may be stored in several different locations. Material at each location may be considered "low strategic significance" but the total under the license may be "moderate strategic significance". Also, the converse may be true. "Low strategic significance" material from two different licenses may be stored occasionally in one location and the total might be considered of "moderate strategic significance".

Issue: The question of the amount of material covered under one or more licenses and the location at which the material is used or stored is not specifically covered in the rule. This is an area which needs to be covered in the appropriate guidance package.

Action: Guidance should include specifically the means for determining when material should be protected as material of Moderate or Low Strategic Significance, depending upon their location or collocation with material held under different licenses.

Suggested Resolution of Issue:

- o Guidance should be issued which states the following general principles:
 - 1) The physical protection measures to be taken by the licensee should be determined on the basis of the total amount of SNM in the custody of the licensee at each location, regardless of the real ownership of the material, and regardless of the number of different licenses under which the material is being held.
 - 2) If the licensee holds material under two or more different licenses at a single location, it must be protected according to the strategic significance attached to it collectively, even if the material is only temporarily located at a common site for a short period of time.
 - 3) If the licensee holds material under a single license, or under two or more different licenses concurrently, he may choose to collocate the material or not. However, the appropriate level of protection must be given the material at any one location depending upon the material at a given location. (e.g. The licensee may divide the SNM in his possession for use and storage at two different locations (possibly at the same site or at nearby sites) so that only "Category III" protection need be provided in each case, rather than having to provide "Category II" protection for all of the material at a common location, if such is his choice.
 - 4) If the licensee chooses to separate the SNM under his control for use or storage at two or more different locations, then he must conform to the requirements for the protection of SNM in transit corresponding to the type and amount of material transferred for each transfer operation.

3
Commenter: SUNY

Applicable Section of Proposed Rule: §73.2(aa)

Comment: It is suggested that redefinition of the lower limits for "Category III" be considered taking into consideration such factors as geographic location within a site.

Issue: The commenter states that there are a large number of one curie Pu-Be sources in his possession and at other sites which contain usually about 16 grams of Pu each. The present categorization of SNM of Low Strategic Significance places a lower limit of 15g on the amount of Pu which must be protected. This limit does not exist in the IAEA definition of Category III materials. Raising the limit for plutonium above 16g would allow licensees to freely use their Pu-Be sources without having to incur expenses for protecting the material under the proposed rule. The limit could be raised even higher to allow the free use of more intense sources such as 5-ci and 10-ci sources (having approximately 81 to 160 g of plutonium, respectively), but there comes a point at which the line has to be drawn. IAEA categorization of plutonium suggests that the state (i.e. the USNRC, in our case) may determine that there is a credible threat to disperse plutonium malevolently, in which case physical protection should be required for all plutonium regardless of quantity.

Action: The NRC should declare whether the dispersal threat has been deemed credible and apply the protection measures to various quantities of plutonium accordingly.

The NRC should also consider the raising of the limit for plutonium quantities of low strategic significance in the case the dispersal threat is not considered credible for the types of material being considered (sealed Pu-Be sources of from 1 to 10 ci).

Guidance should be provided regarding the type of protection which may be provided for sealed sources for use in laboratories which may not be protected as controlled access areas, in the case that exceptions are made for these materials. This would correspond to an intermediate position (i.e. in effect, a fourth category) in which a lower level of protection is permitted for sealed sources. Alternatively, the Commission may reassert its previous position that the material must be protected according to its quantity and type and that the owners of sources can exchange them for other equivalent sources which do not contain Pu.

Suggested Resolution of Issue:

- o The dispersal threat for quantities of plutonium corresponding to the categorization of SNM of Low Strategic Significance is deemed not credible. Therefore, the NRC will consider various exemptions and rule changes which will allow the freer use of sources containing plutonium.
- o The limit for plutonium contained in SNM of Low Strategic Significance is raised from 15g to 85g so that neutron sources of up to 5ci will not require protection under the proposed rule.
- o Under existing requirements (§70.52(b)) licensees holding Pu-Be sources containing 1 g or more of plutonium are still required to report the theft or diversion of such materials to the NRC, so that adequate protection against multiple thefts would remain in place. At least 50 such thefts would be required in order for a single adversary or group to obtain a formula quantity of plutonium in this manner.

Proposed Rule Change:

§73.2(aa) revised to read as follows:

(1) Less than... of this part, 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 85 grams of plutonium or the combination of 15 grams when computed by the formula $\text{grams} = (\text{grams contained U-235} + \text{grams U-233})$

3

Commenter: SUNY

Applicable Section of Proposed Rule: §73.47(d)(4)

Comment: There is no indication of what constitutes adequate preemployment screening.

Issue: The term "preemployment screening" raises some questions as to the applicability of this function to different categories of individuals the licensee may wish to provide with authorization to have access to the SNM. Would non-employees such as students, faculty members (not strictly employed by the licensee), guest researchers, etc. be required to have some type of screening to determine trustworthiness prior to being given authorization? Would only employees in the strict sense of performing services for wages be permitted unescorted access? If employees are already in the employ of the licensee, is "preemployment screening" possible without a contradiction in terms? Would this imply grandfathering to be permitted? Also, the screening activity may be misinterpreted as providing NRC "clearances" which was not the intent of the rule.

Action: The term, "preemployment screening" should be changed or amplified in the rule to resolve the possible misunderstandings which have been reflected in the comments.

Also, sufficient guidance should be prepared to demonstrate the extent to which the screening should be done and the various means of screening which would satisfy the requirement.

Suggested Resolution of Issue:

- o The term "preemployment" needs to be changed to reflect the types of relationships which may exist between the licensee and individuals normally given access to the SNM.
- o Guidance needs to be provided indicating the scope of the screening process, what types of screening efforts may satisfy the requirements of the proposed rule, and what the policy will be with regard to present employees who are found to be untrustworthy as a result of the screening process, if such a situation arises.

Action:

§73.47(d)(4) is revised to read as follows:

(4) Conduct a screening process to determine the trustworthiness of all individuals who may be authorized unescorted access to the special nuclear material before such authorization is granted.

Guidance:

Guidance will be provided encompassing the following general principles:

- 1) The screening process can be a national agency check equivalent to the screening done pursuant to the granting of an NRC-U clearance. Alternately, the screening can be done by the licensee's regular employment office following broad guidelines which would correspond to the usual check of references made by employers of potential employees. The criteria for acceptance would likewise be fairly liberal. For example, the applicant should have no felony convictions, and be stable emotionally in the best estimation of his previous employers, teachers, and colleagues.
- 2) Existing employees may be screened on the basis of their employment history over a given period. Thus, if a significant part of that period was with their present employer, the employer may provide the information for the screening process most readily. The employer (i.e. the licensee) is responsible at any point in time for assuring that the individuals which he places in a position of trust with regard to the SNM in his control is indeed trustworthy. If information becomes available to the licensee, either as a result of the screening process, or otherwise, it is his obligation to reassign the employee so as to remove the implied threat to the facility. This is the employer's prerogative regardless of whether there is an external requirement for such a screening process to be conducted.

3) If the licensee determines that a given applicant or an existing employee is not sufficiently trustworthy to be given unescorted access to the SNM under the licensee's control, there is no NRC requirement that such an individual be excluded from the facility entirely. The licensee may authorize such an individual to be allowed access to the material providing that he is escorted by another individual who has been determined to be trustworthy.

4) The screening requirement will apply to all individuals given access to the SNM, which includes students, faculty members, visiting researchers, as well as regular employees of the licensee.

3
Commenter: SUNY

Applicable Section of Proposed Rule: §73.47(d)(5), (6), and (7) and §73.2(b)

Comment: Authorized individuals are required by the proposed Section 73.47(d)(5), (6), and (7). Section 73.2(b) defines authorized individual as an individual with responsibility for surveillance of SNM. In a university research reactor such as ours where unirradiated material in either category II or III is stored within a containment vessel and containment vessel is a protected area, individuals may be authorized for unescorted access to the containment vessel because of their work assignments, research activities, etc., but are not responsible for the surveillance of SNM.

Issue: The definition of "authorized individual" may be too narrowly defined, or the word "surveillance" in that definition may be similarly too narrowly defined. Surveillance in this sense may mean that the individual must maintain surveillance of SNM in his control only when the material is not in storage or emplaced in the reactor, etc.

Action: Broaden the definition of "authorized individual" and clarify it to assure all individuals would be covered by such definition as intended.

Suggested Resolution of Issue:

- o The term, "Authorized individual" will be defined more broadly so as not to be unnecessarily restrictive in application to the amendments in §73.47. The new definition will refer generally to any particular responsibilities assigned to authorized individuals related to the SNM or not.

Proposed Rule Change:

§73.2(b) revised to read as follows:

(b) "Authorized individual" means any individual, including an employee, a consultant, or an agent of a licensee, who has been designated in writing by a licensee to have responsibility for surveillance or control of special nuclear material, or to perform other tasks in the vicinity of special nuclear material as designated by the authorization document.

4

Commenter: VPI

Applicable Section of Proposed Rule: §73.47(d)(8)

Comment: The security organization requirements are not listed in the proposed rules. Is a Q-clearance necessary?

Issue: The requirement for a security organization can easily be confused with that for "formula quantity" SNM. As such, the requirement may appear unreasonable.

Action: Provide appropriate guidance to indicate the minimum requirements for a security organization; can a campus security force qualify? does the "one watchman per shift" have to be dedicated fully to the building in which the SNM is located, or can he routinely patrol the entire campus? These types of questions must be answered in the guidance developed for this rule.

Suggested Resolution of Issue:

- o Requirements for the security organization are not necessarily identical to those for facilities where formula quantities of SNM are used or stored. However, in lieu of an "Appendix B" covering facilities where SNM of moderate strategic significance is used or stored, some guidance will be necessary.

Guidance:

Guidance should be prepared which explains the level of performance expected of members of the security organization. In the case of Category II material, there would not be as strict requirements in the area of physical capability. However, the licensee would still be expected to employ guards who were in good health, not physically disabled, and in full understanding of their assigned responsibilities. Since the watchman does not have to be uniformed or armed, a guard may not have to be used at all. The plant maintenance supervisor or other management personnel may fill this role as long as such individual was constantly available on call for the full shift to which he is assigned, and can be contacted immediately to respond in the event of an alarm, whatever his other responsibilities.

5
Commenter: UC/SB

Applicable Section of Proposed Rule: §73.47(d)(6)

Comment: Insert "unescorted" between "Limit" and "access".

Issue: The term, "limit access" occurs in §§73.47(d)(5) and (6) of the proposed rule. By its context, it appears that this means unescorted access in each instance. However, in §73.47(d)(7), the term "unescorted" is specifically inserted. This causes confusion in the mind of the uninitiated reader as to whether the absence of the specific term is meaningful or not.

Action: Consider removing the inconsistency in use of terms by either inserting the term "unescorted" in (a)(5) and (6) or removing it from (d)(7).

Suggested Resolution of Issue:

- o It appears that the term "unescorted access" appears just once in this Part. In most cases the meaning is clear, but this could be cleared up in guidance, if necessary. An additional definition in §73.2 would be out of place since the way the word "access" is used in this Part does not depart significantly from the general meaning of the word as ordinarily used in the language.

Proposed Change in Rule:

§ 73.47(d)(7) will be revised to delete the word "unescorted".

Guidance:

It will be made clear in the guidance that "access" may mean unescorted access or escorted access depending upon the particular authorization which allows for such access.

Commenter: RI/AEC

5

Applicable Section of Proposed Rule: §73.47(d)(10)

Comment: This section requires a "search... (of) packages entering or leaving the controlled area". This would require searching of packages carried by operations personnel and research personnel who enter and leave the controlled area (reactor room) frequently. Except for the Director and Assistant Director, these individuals do not have access to the fuel vault.

Issue: The reactor facilities apparently have a different safeguards problem than the licensees who merely handle small sources. If there are no small sources under the license, then the SNM being protected is often in a quite bulky form which could not easily be concealed in small packages or on one's person. Also, the SNM would be stored most likely in a room which can be locked and treated as a controlled access area, and which may be enclosed within a larger area. It apparently is felt by many of the reactor licensees that there should be no need to place expensive controls on this larger area where most of the personnel function when the material is for the most part confined to the much smaller area of the vault-type room. However, the requirement that the entire area where the material is stored and used be treated as the controlled access area presents cost limitations since they would find it too expensive to install alarm equipment for both the larger and the smaller inner area.

A possible resolution of this problem which could be described in guidance would be for the licensee to treat the smaller area as the controlled access area most of the time so that only it needed to be alarmed. The larger area could be cleared of unauthorized personnel in the event that fuel needed to be loaded or otherwise used in the larger area, which would be the temporary controlled access area for as long as this use continued. The licensee would be limited in that he would be required to complete his use of the material before the larger area became unoccupied since any SNM which had to be protected would have to be placed in the vault-type room or in an inaccessible location within the reactor. The guidance would also have to specify in which instances the reactor core had to be included in the controlled access area depending on the degree of accessibility.

Suggested Resolution of Issue:

- o Much of the perceived difficulties in this issue have to do with the size of the controlled access area in which the SNM is used and stored. It is intended that this area be as small as practicable while encompassing the main areas where the SNM is stored and used. This would normally contain the room which contains the GSA storage cabinet (or would be the vault or vault-type room itself) and the reactor room if a reactor is involved. The larger areas where

7

Commenter: UC/SB

Applicable Section of Proposed Rule: §73.47(d)(2)

Comment: State stored fuel may be protected in any secure facility such as locked cask, cabinet; rack or covered pool - not necessarily a vault or GSA cabinet - unless protected by high radiation level.

Issue: Apparently stored fuel at non-power reactors is now customarily secured in locked casks, cabinets, racks, or covered pools. The requirement to store these materials in a vault, vault-type room, or GSA approved security cabinet may seem overly restrictive if these other modes of storage offer equivalent levels of protection.

Action: Consider adding language to applicable section allowing for other types of storage if equivalent level of protection can be demonstrated.

If additional language is inserted, provide guidance to allow licensee to determine how "equivalent level of protection" would be determined based upon characteristics of GSA security cabinets and vaults or vault-type rooms.

Suggested Resolution of Issue:

- o Allow alternative types of protection for stored fuel at non-power reactors if equivalent levels of protection can be demonstrated compared to that which is nominally required.

Proposed Rule Change:

§73.47(d)(2) revised to read as follows:

(2) Store such material within a vault, vault-type room, or GSA approved security cabinet, or in such a manner as to provide an equivalent level of protection.

Guidance:

Specific guidance is to be provided describing the ways in which equivalent protection may be provided, and criteria for NRC to determine the sufficiency of alternative methods of protection of stored SNM on a case by case basis.

Commenter: UC/SB

7

Applicable Section of Proposed Rule: §73.47(d)(6)

Comment: Insert "unescorted" between "Limit" and "access".

Issue: The term, "limit access" occurs in §§73.47(d)(5) and (6) of the proposed rule. By its context, it appears that this means unescorted access in each instance. However, in §73.47(d)(7), the term "unescorted" is specifically inserted. This causes confusion in the mind of the uninitiated reader as to whether the absence of the specific term is meaningful or not.

Action: Consider removing the inconsistency in use of terms by either inserting the term "unescorted" in (d)(5) and (6) or removing it from (d)(7).

Suggested Resolution of Issue:

- o. It appears that the term "unescorted access" appears just once in this Part. In most cases the meaning is clear, but this could be cleared up in guidance, if necessary. An additional definition in §73.2 would be out of place since the way the word "access" is used in this Part does not depart significantly from the general meaning of the word as ordinarily used in the language.

Proposed Change in Rule:

§ 73.47(d)(7) will be revised to delete the word "unescorted".

Guidance:

It will be made clear in the guidance that "access" may mean unescorted access or escorted access depending upon the particular authorization which allows for such access.

Commenter: UC/SB

7

Applicable Section of Proposed Rule: §73.47(d)(8)

Comment: The university is protected by a police force but cannot afford to hire a watchmen to stand guard or patrol a controlled access area. Perhaps this provision should be general, to be negotiated with NRC as in a physical security plan.

Issue: There seems to be considerable apprehension as to what constitutes an adequate security organization and the extent to which its members may be dedicated to the task of protecting the licensee's facility containing SNM.

Action: Sufficient guidance should be prepared describing what is expected of the security organization.

Suggested Resolution of Issue:

- o The confusion seems to arise from the term, "watchman". In the ordinary sense of the word a watchman might be expected to remain at a post or patrol the area immediately surrounding or within the facility in question; however, the strictly defined use of this term in Part 73 allows for a greater degree of latitude in the performance expected of a watchman. A watchman, in this case, is an individual assigned among his other duties to provide protection to the facility by responding to alarms when called upon to do so. He is not necessarily uniformed or armed, and does not have to be in the direct vicinity of the protected facility at all times. In this sense, members of a campus police force or protective service would qualify, and a full-time dedicated watchman would not be required.

Guidance:

The above clarification should appear in the guidance.

Commenter: CMC

9

Applicable Section of Proposed Rule: §73.47(a)

Comment: We would object to the requirements for general performance objectives being imposed in addition to specific requirements contained in other sections. Conformance with the specific design requirements must be considered as fulfilling any general performance objectives.

Issue: It is not clear what role the general performance objectives play in determining what physical protection measures will be considered acceptable by NRC. What would be the effect on the proposed rule if they were deleted? Unless there is some serious role to be played the proposed rule should not be unnecessarily encumbered by their inclusion.

Action: The general performance requirements provide a basis for evaluation of licensee submitted plans and practices consistent with IAEA approved guidelines. If these objectives were not included in the rule, the specific requirements would have to be much more detailed and as a result, the staff would have much less freedom to allow the degree of flexibility necessary to achieve the desired levels of protection in a manner which would be most cost-effective for each of the affected licensees. This desirability for flexibility is inherent in the IAEA approach which recommends making exceptions to IAEA recommendations on a case by case basis for research oriented facilities.

Commenter: CMC

⑨

Applicable Section of Proposed Rule: §73.47(c)

Comment: The word "all" should be changed to "the appropriate sections" since licensees may only have SNM of low strategic significance and, therefore, not all the above stated subsections would be applicable.

Issue: The question is whether the rule makes sense logically with the word "all" as written. Since the individual sections §§73.47(d), (e), (f), and (g) specifically define the situations in which they apply, it does not seem necessary to change the existing wording. Also, adding the word, "appropriate" raises more questions since one would then have to define what is appropriate.

Action: None

Commenter: CMC

①

Applicable Section of Proposed Rule: §§70.22(j), 73.47(d), (f)

Comment: It is not clear whether this section (§70.22(j)) (and others referenced above) seeks to exclude a license to possess fuel for a light water nuclear reactor prior to the granting of an operating license.

Issue: The language of the referenced sections does seem somewhat vague as to what facilities are covered by the rule. The present interpretation appears to be that the proposed protection requirements apply to power reactors which apply for a license to possess fuel, but which do not yet have a license to operate. However, since the requirement for submitting a plan for providing protection under §73.47 allows an exemption for power reactors having a license for possession or use of SNM of moderate or low strategic significance (§73.22(j)) power reactor licenses would be responsible for providing protection for their fuel before loading but would not have to submit a separate plan in addition to that required under §73.55.

Action: Provide guidance which explains the responsibilities of power reactor licensees for protection of fuel before loading.

Make clear the responsibilities of power reactor licensees for protection of fuel before loading by adding explanatory material to the statement of considerations.

Commenter: UNCAR

12

Applicable Section of Proposed Rule: §73.47(d)(1), (2)

Comment:

Under proposed Part 73.47 (d), SNM of moderate significance when stored or used must be kept in a controlled access area, and when stored must in addition be in a vault, vault-type room, or GSA-approved security cabinet. This will cause problems in cases where the SNM is subdivided amongst a series of processing steps, which may be separate material balance areas (MBA's), but where the steps may be actively operational at different times. Very often such subdivision may also be dictated by criticality safety considerations, with the individual MBA amounts in IAEA Category III, but the combined possession amount in Category II. In many instances the SNM in each MBA may be in a chemical or physical form, or so located, that storage in vaults or cabinets would be impracticable or in violation of critical safety rules.

It is recommended that the term "use" be defined in such a manner that when SNM of moderate significance is released from storage for use in a process, where the individual process steps each are limited to not more than an IAEA category III quantity (e.g., ≤ 1 Kg of $> 20\%$ ^{235}U , unirradiated), the material be considered to remain in use until the process is completed. This is to obviate the need to collect and place in a vault all material from process steps that may be temporarily inactive.

Action: The term, "use" can be considered extended to the application in which SNM is allowed to remain in process equipment, as long as the area in which such equipment is located remains occupied by authorized personnel. However, if at any time the area becomes unoccupied, the material would have to be considered in "storage". The requirements for protection of stored material would then apply. This clarification should be made in the guidance.

Commenter: MIT

14

Applicable Section of Proposed Rule: §73.47(d), (f)

Comment:

Since the low and exempt quantities are possessed on one contiguous site along with the unirradiated reactor fuel, it appears that all SNM would be subject to the same safeguard requirements as the fuel and would have to be covered by the amended security plan. This would impose unnecessarily stringent security requirements on the low and exempt items and would most likely preclude their use in teaching laboratories and probably in much research. It is strongly urged that the rule permit varying levels of security commensurate with the strategic significance, if any, of the material.

Issue: The proposed rule does require licensees to provide different levels of protection for SNM of low or moderate strategic significance based upon the cumulative quantity of SNM possessed by the licensee under a given license. Also, the sections which require submission of a protection plan are based upon the amount and type of material which would be used or possessed under a given license application, while the actual protection requirements seem to be keyed to the total amounts used or possessed by the licensee under any and all licenses he has with NRC. Furthermore, the protection requirements of §73.47 depend upon the amount possessed or used but do not specifically allow the licensee to afford less protection to material having lesser strategic significance (low versus moderate, exempt versus low).

The result of this set of requirements then, under one interpretation, would be that different levels of protection would be given to the same types and amounts of material by different licensees simply because one licensee possessed or used different cumulative amounts of SNM under a given license or set of licenses or at different locations.

Action: The rule may need to be changed to specifically address the intent of the NRC when amounts of SNM are possessed or used (a) under different licenses, (b) at different locations, or (c) of different types at the same location. For example, requirements for the protection of SNM of low strategic significance should be relaxed at all facilities regardless of how much additional material is possessed by the licensee at each facility, as long as the required levels of protection are maintained for each type of material used or possessed by the licensee.

Some of the added information required could be reserved for the guidance.

Commenter: MIT

14

Applicable Section of Proposed Rule: §73.47(d)(11)

Comment:

The rule proposes a requirement to "Establish and maintain contingency plans for dealing with threats of thefts or thefts of such material." It is our belief that a contingency plan of the scope required by Appendix C of Part 73 is not intended. Therefore, we suggest that "contingency plans" in the proposed rule be changed to "procedures" or some other terminology in order to avoid confusion with Appendix C.

Action: The guidance should describe the scope and content of contingency plans required under the proposed rule. This would make clear the difference between the requirements under this rule and that which is required for "formula quantities of SNM", as described in Appendix C.

Commenter: TRNUC

20

Applicable Section of Proposed Rule: §73.47(c)

Comment: At least 180 days should be allowed for preparation of a security plan. The proposed 60 days is much too short.

Issue: Since the staff has determined that much of the protection required by the proposed rule is already in place, an extension to 180 days for the period allowed for submitting plans would seem unnecessary. However, in those situations where the licensee must make an institutional decision whether to comply with the rule or dispose of its SNM in whole or in part, or whether to allocate the necessary funds in its budget for additional protection, and then gain approval for such funding, the time of 60 days would seem too short.

The 60 day requirement, it should be noted, refers to the time within which the licensee is expected to submit a plan for complying with the proposed rule. The schedule of implementation may take account of individual exigencies and institutional limitations; no time limit has been announced for implementation of each plan. These problems can thus be dealt with on a case by case basis. The guidance may indicate that interim plans may be filed to allow for individual problems at each facility.

Action: Guidance should reflect guidelines for submitting interim plans where temporary budgetary and other institutional factors prevent rapid implementation. This would only be required initially, since future applicants would be able to combine their plans for protection with the remaining license application plans.

Commenter: TRNUC

20

Applicable Section of Proposed Rule: §§73.47(e)(1)(iv) and 73.47(g)(1)(iv)

Comment:

The check of the integrity of the containers, locks and seals prior to a shipment of special nuclear material of moderate and low strategic significance from a facility which is not licensed by the NRC, such as a Department of Energy gaseous diffusion plant, should not have to be performed by an employee of the licensee. If the licensee cannot rely on the shippers verification of container and seal integrity, he will be required to send an employee to the shipper's facility prior to each shipment thus incurring unnecessary expenses and possible delays.

Issue: Although the requirements for licensees engaged in SNM transport activities are clear, it is not clear who has responsibility for each requirement when a number of different organizational entities are involved, some of which are not even licensees.

Action: Provide guidance which indicates separately the responsibilities of licensees engaged in the separate activities of transport, export, or delivery to a carrier for transport. Especially indicate the responsibilities with regard to the licensee when DoE is involved.

Commenter: TRNUC

20

Applicable Section of Proposed Rule: §§73.47(e)(3)(i) and (ii)

Comment: These provisions for practical purposes eliminate the possibility of utilizing less-than-truckload (LTL) shipments on motor carriers and eliminate the use of railroads altogether. The only sure method of meeting the intent of these proposed regulations is utilization of exclusive use trucks, which will increase costs significantly. We do not believe the increased costs are justified by the marginal increase in security.

Issue: The subject requirements are to: (i) Arrange for a telephone or radio communications capability between the carrier and the shipper or receiver, and (ii) Minimize the time that the material is in transit by reducing the number and duration of transfers and by routing the material in the most safe and direct manner.

The requirements for telephone or radio communications do not indicate that they must be continuous in character, nor is there a required frequency with which such communications must be made. As such it would be very difficult to determine whether the requirements so limit transportation modes.

The requirement to minimize the time that the material is in transit also suffers from a lack of detail so that no clear standard for transportation is understood. Especially, the mode of minimization, "by reducing the number..." is difficult to comprehend because there is no reference provided from which the reduction process must proceed, and no criteria for determining when enough "reduction" has been achieved.

Action: Provide guidance to detail what is expected in the transport of SNM of Moderate and Low Strategic Significance.