

March 9, 1978

UNITED STATES
NUCLEAR REGULATORY COMMISSION

SECY-78-142

CONSENT CALENDAR ITEM

For: The Commissioners

From: Clifford V. Smith, Jr., Director
Office of Nuclear Material Safety and Safeguards

Thru: Lee V. Gossick, Executive Director for Operations *in J. L. G.*

Subject: PHYSICAL PROTECTION OF CATEGORY II AND III MATERIAL

Purpose: To obtain the Commission's approval of a proposed amendment to 10 CFR Part 73.

Category: This paper covers a major policy question.

Issues:

- Are physical protection measures recommended in the IAEA publication (INFCIRC/225) for Categories II and III material justified?
- Should NRC issue for public comment proposed new rules for protection of Categories II and III material?

Discussion: On February 11, 1977, the Office of Nuclear Material Safety and Safeguards submitted SECY 77-79. That paper analyzed the issue of whether on-going NRC actions to upgrade physical protection requirements should meet recommended international standards and if so, to what extent should the recommendations of the IAEA and/or the Nuclear Supplier Group (NSG) be adopted as a basis for regulatory change. The relevant recommendations of SECY 77-79 were:

- Adoption of the NSG categorization of material which subsequently was accepted almost in its entirety by the IAEA* and published in INFCIRC/225, June 1977. The published table is Enclosure 1.

*The only exception for unirradiated material is that INFCIRC/225 did not set lower limits for Category III material. The NSG lower limits were used in the proposed amendments to 10 CFR Part 73 attached to this paper as Enclosure 3.

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- b. Adoption of general performance requirements for Categories II and III material that would provide protection equivalent to the measures recommended in INFCIRC/225.

On June 30, 1977, the Commission issued its response to SECY 77-79 (Enclosure 2) in which it approved the general approach recommended by the staff and directed the staff to develop a proposed rule, subject to resolution of the following questions:

1. What is ERDA's (DOE) position and plans with respect to requiring protection of LEU?
2. Are current NRC requirements for protection of SNM in transit operationally equivalent to those recommended in INFCIRC/225?

Other background information is provided in Enclosure 3.

Question 1: What is DOE's position and plans with respect to requiring protection of LEU?

DOE plans to issue an Interim Management Directive (IMD 6103, the DOE equivalent of NRC regulations) to require protection measures for Category II and III (which includes LEU) materials that closely follow recommendations in INFCIRC/225. The directive is out for field review.

Question 2: Are current NRC requirements to protect SNM while in transit operationally equivalent to those recommended in INFCIRC/225?

For the protection of Category I material in-transit, the NRC provisions equal or exceed the INFCIRC/225 recommendations, with the following exceptions.*

- o INFCIRC/225 recommendations call for a determination of trustworthiness for those persons involved in the transportation of Category I material. Currently, the matter of trustworthiness is addressed in the licensee's transportation security plan. These plans are evaluated by the NRC staff in accordance with written criteria as follows: "The (license) applicant must have a

*These exceptions were also noted in SECY 77-79.

program for screening and selection of individuals who will protect SNM shipments. A candidate must have a satisfactory previous employment history. A background check of each candidate should be conducted."

The current practice for trustworthiness determinations would be strengthened and clearly meet the INFCIRC/225 recommendations if the Commission approves and publishes the proposed rule on security clearances that was issued for public comment on March 17, 1977.

- o INFCIRC/225 recommendations call for road shipments by exclusive use vehicles and for a detailed search of all shipping vehicles (truck, aircraft, or ship) prior to loading. Current NRC requirements only call for road shipments to be made without intermediate stops, but in practice all shipments are made in an exclusive use truck. Detailed vehicle searches are not currently required, but would be required for trucks and aircraft under the upgrade requirements issued by the Commission for public comment on July 5, 1977.

For both Category II and III material, the INFCIRC/225 recommendations call for minimizing the time the shipment is in-transit, minimizing the number and duration of transfers, avoiding regular movement schedules, predetermination of trustworthiness of all individuals involved in the transportation of shipments, advance notification to the receiver, provision of locks and seals, search of the load vehicle, and certain measures to be carried out by the receiver upon receipt of a shipment or upon non-arrival of the shipment. In addition, the INFCIRC/225 recommendations for Category II material call for special attention to be given to selection of transportation and routing, issuance of written instructions to transportation authorities and frequent telephone communication between the shipment vehicle and a control point. Currently, the NRC has no requirements for the protection of Category II and III shipments but does require that licensees report any actual or attempted theft or sabotage. The requirements proposed in this paper

would be equivalent to the INFCIRC/225 recommendations for Category II and III material.

Issue a: Justification for protection of Category II and III materials.

Protection of plutonium, U-233 and high enriched uranium can be justified on the grounds that a formula quantity* could be obtained through multiple thefts of Category II and III materials.

Protection of uranium enriched to less than 20% (LEU) may have technical justification based on the chance that without safeguards, it might be possible to divert such materials out of the U.S. for additional enrichment or for production of plutonium without detection. Regardless of the technical justification, the results of a limited survey of affected facilities indicates that almost all of them already have security measures in place which would satisfy the requirements of INFCIRC/225. Therefore, the cost of these requirements is not a major concern.

Although nuclear materials might be involved in a threat to the public through a dispersion scenario, such as sabotage, SECY 77-79 states the risk from dispersion of small or moderate quantities of nuclear materials (including irradiated materials) does not appear to pose a risk to the public sufficient to justify specific protection measures for these materials at this time.

Enclosure 4 provides a discussion of the possible use of Category II and III materials in the construction of a nuclear weapon.

In conclusion, the staff believes that physical protection of unirradiated SNM in Categories II and III is justified on the basis of enhancing domestic protection of such materials by providing detection and deterrence capabilities and demonstrating U.S. willingness to cooperate with the International Atomic Energy Agency (IAEA). Issuance of specific protection requirements for protection of small or moderate quantities of

* "Formula Quantity" means strategic special nuclear material in any combination in a quantity of 5,000 grams or more computed by the formula, grams = (grams contained U-235) + 2.5 (grams U-233 + grams plutonium).

irradiated nuclear materials is not considered necessary at this time.

Insofar as the staff believes that the timely detection of the theft or diversion of SNM in Categories II and III is in the public interest and the additional costs are not excessive, the cost of this protection should be borne by the licensees. Accordingly, alternative arrangements for absorbing costs were not analyzed.

Issue b: Description of the proposed rule for protection of Categories II and III material.

The proposed rule (Enclosure 5) would apply to Category II and III material at non-power reactors licensed under 10 CFR Part 50 and at facilities and in shipments licensed under 10 CFR Part 70. Power reactors having Category II and III materials are covered by 73.55. In addition, 10 CFR Part 150 would be modified to require the application of 10 CFR Part 73 protection requirements to those Agreement State licensees (approximately 500) who possess Category III material.

Licensees who possess Category II material and more than 10 kg of LEU would be required to submit for licensing review a physical security plan describing the measures to be employed to comply with the new requirements. We believe that the new requirements for Category III materials other than 10 kg or more of LEU can be implemented effectively by licensees without NRC review of a physical security plan for each installation.

The proposed regulations introduce the term "material of moderate strategic significance" to correspond to the INFCIRC/225 term "Category II material" and the term "material of low strategic significance" to correspond to the INFCIRC/225 term "Category III material." The new terms are needed since categories as defined by INFCIRC/225 are not used in present NRC regulations. The following is a summary of the proposed requirements.

Licensees who possess material of moderate strategic significance at fixed sites would be required to:

- . store or use the material only in a lighted controlled access area;
- . equip the area with an intrusion alarm;

- . determine the trustworthiness of persons who have access to the material;
- . develop and use a badging system and limit access to the controlled access area to persons who require such access in their duties;
- . provide at least one around-the-clock unarmed watchman to respond to security incidents or emergencies;
- . provide a communication capability (telephone acceptable) between the watchman and a response force (police acceptable); and
- . search on a random basis vehicles and packages entering or leaving the controlled access area.

Licensees who ship material of moderate strategic significance would be required to:

- . plan and route the shipment so as to minimize opportunities for theft while enroute;
- . coordinate shipment plans with the receiver;
- . arrange for transport of the material in a locked or sealed container;
- . arrange for carrier employees who have custody of the shipment to make scheduled telephone reports of shipment status to the shipper (or receiver).
- . establish a contingency plan for dealing with thefts and threats;
- . determine the trustworthiness of all licensee employees involved in the transportation of the material; and
- . carry out various notification and tracing requirements in the event that a shipment becomes lost or unaccounted for.

Licensees who possess material of low strategic significance at a fixed site would be required to:

- . store or use material only within an area to which access is controlled;
- . continuously monitor (such as with an intrusion alarm) the area to detect unauthorized activities;
- . arrange for a response to all unauthorized activities with watchmen or offsite response force (police acceptable).

Licensees who ship material of low strategic significance would be required to follow requirements similar to those for shipments of material of moderate strategic significance except that:

- . preplanning requirements are less intense;
- . communication capability between carrier and shipper is not required.

Differences between INFCIRC/225 recommendations and the proposed rule.

For material at fixed sites, the recommendations of INFCIRC/225 would be met by the proposed rule. For material in-transit, the significant differences between the INFCIRC/225 recommendations and the proposed rule are identified and evaluated as follows:

- . INFCIRC/225 calls for the search of the load vehicle for sabotage devices. On the basis of the reasoning set forth in SECY 77-79, the NRC staff believes that protection measures directed solely against the dispersion (sabotage) of Categories II and III materials are not required.
- . INFCIRC/225 calls for restraint in the transmission and handling of messages concerning shipments. The staff believes that procedures similar to those used for "Confidential" information in the U.S. would need to be implemented to meet this recommendation. Such a program does not appear to be justified for these kinds and quantities of material.
- . INFCIRC/225 calls for a predetermination of the trustworthiness of all persons involved in the transport of material. The proposed rule restricts

this predetermination to licensee employees. We do not believe such a requirement is necessary or can be practically implemented for all persons involved in the transport of Category II and III materials.

INFCIRC/225 calls for the protection of shipments of irradiated fuel. Under the proposed rule, these shipments would continue to be exempt from protection requirements. The massive container used in transport is believed to provide sufficient protection equivalent to INFCIRC/225 recommendations.

International Impacts

United States acceptance of the INFCIRC/225 recommendations through issuance of the proposed rule would likely be viewed favorably by other nations and possibly be an incentive for them to follow. It would demonstrate continuing United States support for international physical security recommendations which the United States has helped to develop.

Value Impact

Protection requirements for material of moderate strategic significance would apply at 54 facilities. The maximum capital cost per affected facility would be \$11,000, which would apply only if the facility had to install an intrusion alarm system, locks, lights, badge systems and an around-the-clock security force. Maximum annual costs would be \$45,000, almost entirely for guard force salaries and overhead expenses. Since all affected facilities already have watchmen coverage at night and staff coverage during working hours, and many have the required security systems; it is estimated that the industry-wide capital and annual costs will be lower than those given above. It is estimated that actual capital costs would be about \$330,000 and actual annual costs would be about \$33,000 for the 54 facilities.

Protection requirements for material of low strategic significance would apply to almost 500 licensees--the overwhelming majority of which are universities each possessing from 15 to 30 grams of plutonium as 1 to 5

curie Pu-Be neutron sources. The maximum initial yearly cost per secured location is estimated to be about \$3,500, which includes \$660 for an alarm system. Annual costs after the first year are estimated as \$850 which includes a \$240 fee for a commercial response agency. Industry wide incremental initial yearly costs of about \$900,000 and annual incremental costs of \$250,000 are estimated. The bases for these estimates and other supporting data is given in Enclosure 5.

Impacts on NRC staff.

For each of the proposed requirements, the Office of Nuclear Material Safety and Safeguards, the Office of Standards Development and the Office of Nuclear Reactor Regulation would prepare acceptance criteria in sufficient detail to enable NRC reviewers to determine whether a given device or procedure would satisfy the requirement. This work would require no additional staffing for those offices. The effort required to conduct joint reviews of the security plans submitted by the 54 moderate strategic material licensees is estimated to be 44 man months for NMSS, IE, & NRR. No additional staffing would be necessary to complete these reviews or for routine maintenance. Following plan approval by NMSS or NRR, the Office of Inspection and Enforcement would make initial adequacy determinations at each of the affected facilities and thereafter would inspect facilities at appropriate intervals. The Office of Inspection and Enforcement would require additional personnel to carry out this program. This increase will be reflected in the upcoming budget submittal.

Recommendation:

That the Commission:

1. Approve the proposed amendments set forth in Enclosure 5 for publication for comment in the Federal Register.
2. Note:
 - a. that the appropriate congressional committees will be notified of this action, and

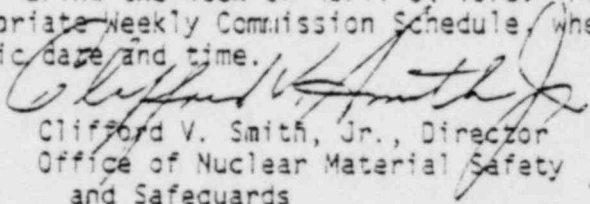
- b. that neither an environmental impact statement nor a negative declaration need be prepared since the proposed amendments are not significant from the standpoint of environmental impact.
- c. Approval by the General Accounting Office of the reporting requirements in the proposed rule will be obtained prior to publication of the effective rule (Enclosure 6).

Coordination:

The Offices of Standards Development, International Programs, State Programs and Inspection and Enforcement, concur in the recommendation of this paper. The Office of the Executive Legal Director has no legal objection. The Office of Nuclear Reactor Regulation concurs in the recommendation of this paper but notes that they currently are drafting requirements that they believe should be incorporated into a separate section of Part 73 to provide acceptable levels of protection against theft of SNM and industrial sabotage at non-power reactors. These requirements would be equivalent to or would exceed those in the proposed §73.47 and INFCIRC/225. These draft requirements will be provided for staff review during the comment period for the subject regulation.

Scheduling:

This paper is tentatively scheduled for consideration at an Open meeting during the week of April 3, 1978. Please refer to the appropriate Weekly Commission Schedule when published for a specific date and time.


Clifford V. Smith, Jr., Director
Office of Nuclear Material Safety
and Safeguards

Enclosures: See next page

Enclosures:

1. Table: Categorization of Nuclear Material
2. Commission Response to JECY 77-798
3. Background
4. Technical Assessment
5. Proposed Rule
6. Value/Impact Assessment Containing a Report Justification Analysis

NOTE: Commissioner comments or consent should be given directly to the Office of the Secretary by close of business Wednesday, March 22, 1978.

Commission staff office comments, if any, should be submitted to the Commissioners NLT March 16, 1978, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

DISTRIBUTION

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ENCLOSURE 1

TABLE: CATEGORIZATION OF NUCLEAR MATERIAL

Enclosure 1

TABLE 1 CATEGORIZATION OF NUCLEAR MATERIALS

Material	Form	Category		
		I	II	III
1. Plutonium ^{a,d}	Unirradiated ^b	2 kg or more	Less than 2 kg but more than 500 g	500 g or less ^c
	Unirradiated ^b	5 kg or more	Less than 5 kg but more than 1 kg	1 kg or less ^c
		—	—	10 kg or more
2. Uranium 235 ^d	Unirradiated ^b	2 kg or more	Less than 2 kg but more than 500 g	500 g or less ^c
	—	5 kg or more	Less than 5 kg but more than 1 kg	1 kg or less ^c
		—	—	10 kg or more
3. Uranium 233	Unirradiated ^b	2 kg or more	Less than 2 kg but more than 500 g	500 g or less ^c
		—	—	—

^a All plutonium except that with isotopic concentration exceeding 70% in plutonium 238.
^b Material not irradiated in a reactor or material irradiated in a reactor but with a radiation level equal to or less than 100 rads/pound at one meter unshielded.
^c Less than a technologically significant quantity should be exempted.
^d Natural uranium, depleted uranium and thorium and quantities of uranium enriched to less than 10% not falling in Category III should be protected in accordance with prudent management practice.
^e Irradiated fuel should be protected as Category I, II or III nuclear material depending on the category of the fresh fuel. However, fuel which by virtue of its residual fissionable material content is included as Category I or II before irradiation should only be reduced one Category level, while the radiation level from the fuel exceeds 100 rads/lb at one meter unshielded.
^f The State's competent authority should determine if there is a credible threat to disperse plutonium inadvertently. The State should then apply physical protection requirements for category I, II or III of nuclear material, as it deems appropriate and without regard to the plutonium quantity specified under each category herein, to the plutonium isotopes in those quantities and forms determined by the State to fall within the scope of the credible dispersal threat.

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ENCLOSURE 2

COMMISSION RESPONSE TO SECY-77-798