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REPORT OF THE COMPTROLLER GENERAL OF THE UNITED STATES

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SHORTCOMINGS IN THE SYSTEMS USED TO CONTROL AND PROTECT HIGHLY DANGEROUS NUCLEAR MATERIAL
Energy Research and Development Administration

D I G E S T

With increasing reliance being placed upon nuclear-generated energy in the United States, the public must be protected against hazards that can occur from theft or unauthorized use of "special nuclear material"--the most dangerous being plutonium and enriched uranium. In addition to being suitable for the fabrication of bombs, plutonium is [illegible]mely toxic substance, with a potential of cau[illegible] if inhaled, ingested, or exposed to an open w[illegible]

Because of the importance of effective safeguards for special nuclear material to the development of the nuclear industry, the Congress should favorably consider requests of the Administrator of the Energy Research and Development Administration for funds to improve physical security systems at its facilities where special nuclear material is held.

Such materials, in the hands of malevolent individuals or groups, could be used in an explosive device or as a radioactive poison. As such, they are a potential object of terrorist groups or criminals in this country or of agents of other countries.

The potentially catastrophic consequences of even a single theft of a sufficient amount of special nuclear material makes it essential that such material be adequately protected so that thefts cannot occur.

As the manager of Federal energy research and development programs, the Energy Research and Development Administration is responsible for making sure that all nuclear materials held by facilities it sponsors are safeguarded properly against theft or unauthorized use.

The basic systems used by the Energy Research and Development Administration are:

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--accountability and material control systems for detecting thefts; and,

--physical security systems to prevent or respond to thefts or unauthorized uses.

The interaction of these systems at a facility are relied upon to preclude the loss or theft of special nuclear material.

Accounting for nuclear materials is extremely complex, based on physical, chemical, and radiometric measurements. Accurate measurements cannot be obtained because of uncertainties in measurement instruments and difficulties in measuring nuclear materials held up in pipes, machinery, and filters.

As a result, discrepancies normally occur between physical and book inventories. Discrepancies which cannot be identified have been termed "material unaccounted for" which is a prime indicator of the effectiveness of nuclear materials accountability and material control systems.

The Energy Research and Development Administration has recognized the imprecisions and limitations of the accountability systems. Since fiscal year 1968, the agency has had an ongoing research and development program aimed at improving the state of the art of the instruments used to measure and record nuclear materials.

For fiscal year 1976, the agency has 11 research and development projects directed at improving the precision and timeliness of measurement instrumentation. They are funded at about $2.1 million.

Through fiscal year 1981, the agency plans to spend an additional $17.6 million for such improvements. Also the agency is developing a computerized measurement and accountability system that may permit continuous control of such material through automated recording and measurement techniques resulting in more timely special nuclear material data.

The Energy Research and Development Administration's accountability and material control system in our judgement contains vague and outdated requirements which have resulted in inconsistent inspection practices and lack of specific numerical criteria when responding to missing special nuclear material.

GAO recommends that the Administrator:

--undertake an effort to immediately update accountability and material control system requirements to reflect current needs and capabilities of today's safeguarding environment and specify the minimum acceptable levels of measurement precision that will be tolerated for facilities having special nuclear material;

--develop and implement inspection practices that eliminate existing inconsistencies and provide inspectors with uniform, well-defined guidelines explicitly distinguishing between the various special nuclear material environments; and

--develop specific numerical criteria for determining when a "material unaccounted for" becomes significant. GAO also recommends that these criteria be established as operating requirements for facilities having special nuclear material.

With the imprecisions and other limitations associated with the accountability and material control systems of nuclear materials the physical security systems take on increased significance in further attempts to make sure that nuclear material cannot be stolen.

Since fiscal year 1972, the Energy Research and Development Administration has been continually upgrading physical security systems. Recently, the agency has identified additional weaknesses in the physical security systems at its contractor facilities. These include the need for additional guards, alarms, doorway detectors, night vision devices, and improved communication equipment not yet available because funds have not been appropriated.

Other problems were identified by GAO during its review of the agency's physical security programs:

1. The Energy Research and Development Administration needs to strengthen and clarify its existing security requirements regarding the placement of special nuclear material detectors and the protection of windows to buildings having this material to allow for better protection of the material against unauthorized use.

2. The Energy Research and Development Administration has not communicated effectively to its operations offices and contractors the nature and dimensions of the threat so that they can evaluate and police the effectiveness of physical security programs.

3. Physical security requirements have not been established for unclassified special nuclear materials in quantities smaller than 5 kilograms of enriched uranium and 2 kilograms of plutonium.

GAO recommends that the Administator should

--strengthen and clarify security requirements concerning the placement of special nuclear material detectors and the protection of windows to buildings having these materials,

--improve inspection practices by incorporating specific threat criteria in the formal management system through inclusion in the physical security manual. This will enable those possessing special nuclear material to evalute and police their systems against an established threat and

--expedite the study of the protection needs for small quantities of plutonium and issue protection requirements to the extent necessary.

Over the past 2 fiscal years the agency has experienced substantial cutbacks in their requests for funds to upgrade existing physical security systems at its

contractor facilities resulting in many of the existing problems identified during our review. In fiscal year 1975 they requested $27 million for such improvements and the Office of Management and Budget approved none of it. In fiscal year 1976, the Administration requested $56.5 million from the Office of Management and Budget of which only $35.9 million was approved. Congress later appropriated $22.8 million of that amount.

In view of the potentially catastrophic consequences of even a single theft of sufficient quantities of nuclear materials and the possible impact such an occurrence could have on the development of nuclear-generated energy, the Energy Research and Development Administration should further emphasize to the Congress the need for providing additional funds to correct the identified physical security deficiencies. In the interim, the Administrator should give top priority to reprogramming available funds for the physical security improvements needed.

Although the Energy Research and Development Administration does not agree that the report provides a balanced, objective picture of its present capabilities to control and protect special nuclear material, GAO believes there are no residual differences on the facts contained in this report. The Administration's comments are included in appendix I.