DOCUMENT RESUME

05659 - [B1286236]

[Reconciliation of Special Nuclear Material Unaccounted For]. EMD-78-58; B-157767. May 5, 1978. 5 pp.

Report to Rep. John D. Dingell, Chairman, House Committee on Interstate and Foreign Commerce: Energy and Power Subcommittee; by Elmer B. Staats, Comptroller General.

Issue Area: Energy: Making Nuclear Fission a Substantial Energy Source (1608).
Contact: Energy and Minerals Div.
Budget Function: Natural Resources, Environment, and Energy: Energy (305).
Organization Concerned: Department of Energy; Nuclear Regulatory Commission.
Congressional Relevance: House Committee on Interstate and Foreign Commerce: Energy and Power Subcommittee. Rep. John D. Dingell.

Previous GAO reports on systems used to safeguard nuclear materials pointed out weaknesses in material accountability systems resulting from state-of-the-art limitations and the need for tighter physical security requirements. After the National Security Council determined that "material unaccounted for" (MUF) data could be released publicly, the Nuclear Regulatory Commission (NRC) and the Department of Energy (DOE) released separate reports in August 1977 on special nuclear material inventory differences. The data presented in these reports were different from that formally provided GAO and the Congress. The agencies explained that the differences resulted primarily from their efforts to refine and expand the data originally provided. GAO determined that the differences resulted primarily from DOE efforts to adjust the original data provided GAO by deleting non-MUF items which were included in the MUF figures originally provided and separating low enriched uranium from high enriched uranium in the MUF data. Another major difference in reported MUF related to DOE's Uranium Gaseous Diffusion Plant at Portsmouth, Ohio. DOE's inability to separate low and high enriched uranium in the data contractors submitted demonstrates a serious past weakness in their reporting requirements. The changes in data given GAO and the Congress raise questions about the reliability of the data and underscore the imprecision involved in accounting for MUF. Both agencies are trying to improve the capabilities of their material accountability systems. (HTW)

6236

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

May 5, 1978

B-157767

The Honorable John Dingell
Chairman, Subcommittee on Energy
and Power
Committee on Interstate and Foreign
Commerce
House of Representatives

Dear Mr. Chairman:

In July 1976 and May 1977, GAO issued reports to your Subcommittee on the two basic systems used by the Energy Research and Development Administration (ERDA), now the Department of Energy (DOE), and the Nuclear Regulatory Commission (NRC) to safeguard special nuclear material. Our evaluation of these systems--(1) material accountability and control systems aimed at detecting thefts and (2) physical security systems to prevent or respond to thefts--identified weaknesses which detract from their ability to protect plutonium and highly enriched uranium. We noted the inability of material accountability systems to accurately measure and account for all nuclear materials in a timely manner because of state-of-the-art limitations and the need for tighter physical security requirements.

Measuring special nuclear material is a difficult and complex task and must take into account physical, chemical, and radiological properties. For many forms of special nuclear material, accurate or uniform results cannot be obtained with currently available equipment. Therefore, discrepancies between physical (what they can measure) and book (what they believe should be there) inventories are usual. Such discrepancies have been termed "material unaccounted for" (MUF). For the most part, MUF is attributed by DOE and NRC to such things as inaccurate measurements and difficult to measure material held up in pipes, filters, and machines used in processing special nuclear material. It may also be caused by clerical inaccuracies and, of course, actual loss of material, including theft. GAO reported that over the years thousands of kilograms of special nuclear material cannot be accounted for, about 70 percent of which is attributed to DOE contractor

EMD-78-58
(30516)

facilities and about 30 percent is attributed to NRC licensee facilities. 1/

At the time of the GAO reports, MUF data was classified as national security information. It was believed that such information, if publicly released, could be detrimental to U.S. security. In January 1977, however, the National Security Council determined that, with few exceptions, data that was over 6 months old could be released publicly. Pursuant to this decision, NRC and DOE released separate reports in August 1977 on special nuclear material inventory differences. These reports contain MUF data on all NRC licensees and on most DOE contractor facilities possessing strategic quantities of special nuclear material. DOE's Rocky Flats Plant and its Y-12 Plant were not included because of the national defense nature of their operations.

The MUF data presented in these reports was different from that formally provided GAO and the Congress. Because of the Congress' and public's concern for the adequate safeguarding and monitoring of special nuclear material we determined why there were differences between these later figures and the MUF figures previously supplied GAO.

The agencies explained that the differences resulted primarily from their efforts to refine and expand the data originally provided GAO. NRC made relatively minor changes to MUF data it previously reported. It adjusted licensee plutonium MUF by 6.4 kilograms and licensee highly enriched uranium MUF data by 2.1 kilograms.

The largest differences in reported MUF data, which amounted to over 3,000 kilograms, applied to the data supplied for DOE facilities. Allowing for differences in reporting periods and the inclusion of some facilities not included in our earlier

---

1/This percentage breakout is based on the accumulated plutonium and enriched uranium MUF reported by DOE and NRC. The MUF attributed to NRC licensees includes about 1,100 kilograms, out of a total of 1,665 kilograms for NRC licensees, attributed to periods prior to the creation of NRC when these facilities were under the jurisdiction of DOE.

reports 1/, we found that the differences resulted primarily from DOE efforts to adjust the original data provided GAO by (1) deleting non-MUF items which were included in the MUF figures originally given us and (2) separating low enriched uranium (nonbomb grade) from high enriched uranium (bomb grade) in the MUF data. In addition, other differences related to the manner in which DOE reported MUF data for its uranium gaseous diffusion plant at Portsmouth, Ohio.

According to DOE officials, until reporting instructions were changed in recent years, contractors reported MUF together with other non-MUF categories of losses such as accidental losses--spills, etc.--and, in the case of uranium, combined both low enriched uranium and high enriched uranium in one MUF figure. This "gross" data was reported to GAO because the agency could not refine it. In preparing its August 1977 report, however, DOE instructed its contractors to review their material accountability records and make the necessary adjustments to reflect "true" MUF.

We found that DOE contractors made adjustments for non-MUF items such as accidental losses after reviewing prior year records. We visited one contractor who had made over 30 such adjustments and found they were supported.

When attempting to separate low enriched uranium from high enriched uranium, however, some contractors ran into problems and were limited in their efforts. For example, because contractors had never been required to record enriched uranium as being greater than or less than 20 percent enriched, they were not in all cases able to identify and separate highly enriched uranium. While some contractors were able to analyze prior years' MUF and break out the MUF by level of enrichment, other contractors could not do so since previous years' records had been destroyed--per records disposal instructions--or provided insufficient data. In such cases DOE went back to any available working documents and had to rely on the memory of personnel involved in the operations or use other subjective judgements in preparing the MUF data. Consequently, the amount of enriched uranium MUF that DOE reported includes some estimates and cannot be considered totally precise. Some contractors also had to make additional changes in MUF figures in

---

1/The GAO report presented MUF data for only those DOE contractors which were operating on December 31, 1975. The DOE report, however, also included MUF data from contractors which were no longer in operation on December 31, 1975, and MUF data for the period January 1-September 30, 1976.

order to correct clerical errors which were made when the data was prepared for GAO and the Congress.

In our view, DOE's inability to separate low and high enriched uranium in the data contractors submitted demonstrates a serious past weakness in their reporting requirements. Without the ability to determine the makeup of reported inventory figures and MUF data, it was extremely difficult for DOE management to routinely analyze the data from an effective safeguards point of view without conducting a detailed review of the contractors' inventory records at the facility. The agency recognized this need and in April 1977 began to require contractors to provide the necessary data for for such analysis.

Another major difference in reported MUF related to DOE's Uranium Gaseous Diffusion Plant at Portsmouth, Ohio. DOE reported to GAO and Congress a cumulative facility MUF of approximately 52,809 kilograms of uranium which it said included uranium of all enrichments--bomb grade and non-bomb grade--as well as natural and depleted uranium. DOE officials told us and your Subcommittee on Energy and Power that because of the continuous nature of the enrichment process it is impossible to attribute part of the total MUF to the specific stage in the process where the material is enriched to bomb grade levels. While calculations show that highly enriched uranium MUF in the process may be over 600 kilograms, DOE stated that it could not determine precise amounts. Consequently, it did not report highly enriched uranium MUF for this facility in its August 1977 report. In commenting on our reconciliation DOE officials told us that in order to provide more complete information they have since decided to include total enriched uranium MUF data (less than and greater than 20 percent enriched) for this facility in future reports. 1/

Based on our review we are concerned that NRC and DOE had to change and clarify the MUF data they originally provided GAO and the Congress. Because state-of-the-art limitations preclude precise measurements of special nuclear materials, the MUF data presented in the agencies' reports is not absolute since estimates must be made in developing the data. The fact that MUF figures given GAO and the Congress less than 1-1/2 years ago had to be changed raises questions about the

---

1/In January 1978 DOE issued a semi-annual report on strategic special nuclear material inventory differences for the period October 1976 through March 1977. This report includes a total 6-month MUF for the Portsmouth facility of 120.3 kilograms.

reliability of the MUF data previously and currently provided. Changes in reported MUF data only underscore the imprecision and subjective judgements involved in accounting for MUF. Authorities believe that MUF is attributed to measurement biases and unmeasurable material held up in equipment, nevertheless no one can be certain of the actual location of the unaccounted for materials.

We recognize that both agencies have placed high priority on improving the capabilities of material accountability systems--such as a new computerized and continuous measurement system currently being developed. These efforts are commendable and should be continued. In the interim, the agencies should continue to place emphasis on improving current systems to ensure that records are accurate.

We discussed this report with NRC and DOE officials and they agreed that the report accurately reflects the adjustments made to the original MUF data provided GAO.

Copies of this report will be sent to DOE and NRC as well as other interested parties.

Sincerely yours,

Comptroller General
of the United States